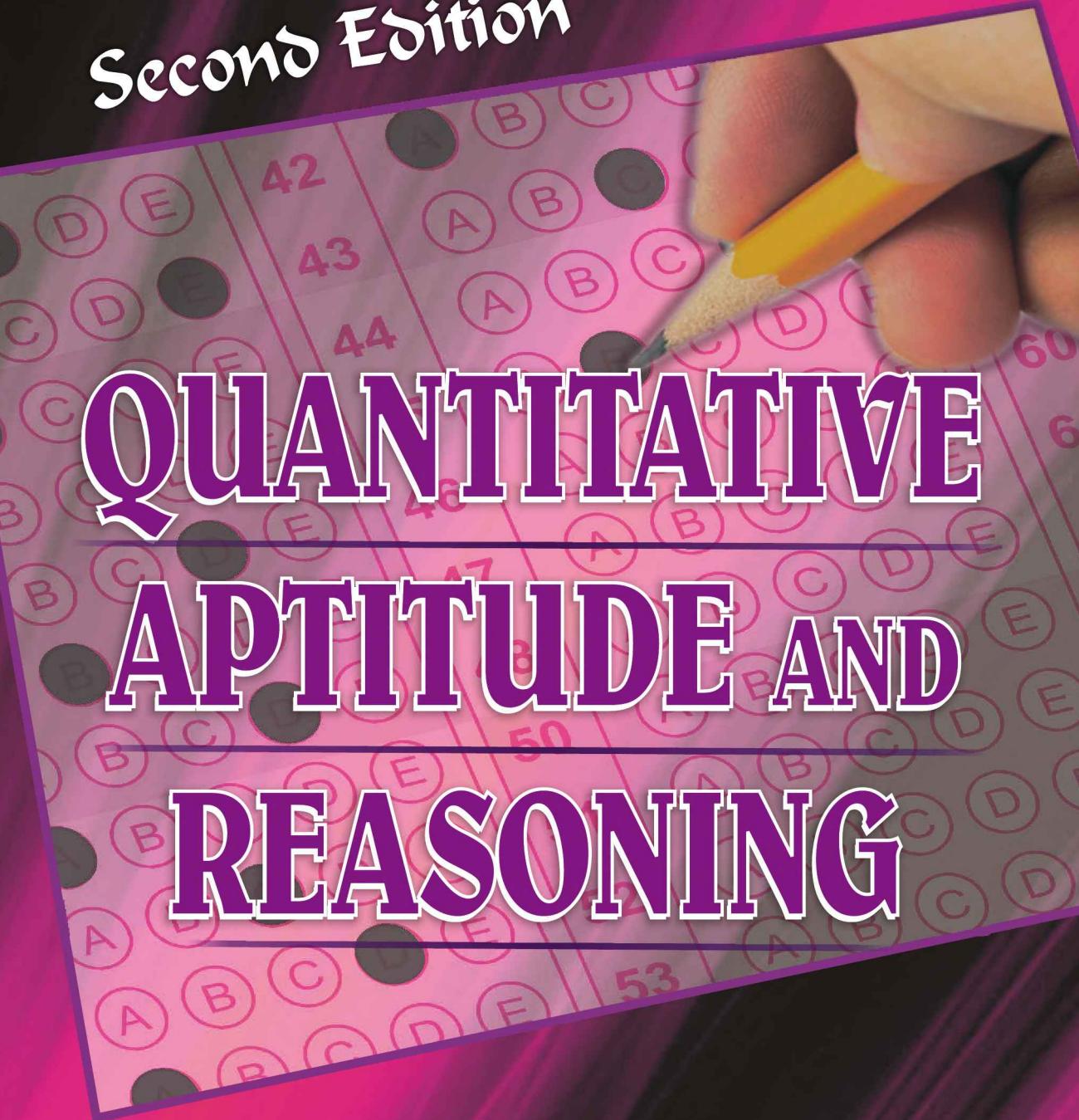


Eastern
Economy
Edition

Second Edition



QUANTITATIVE APTITUDE AND REASONING

R.V. Praveen



Quantitative Aptitude *and* Reasoning

Second Edition

R.V. Praveen

PHI Learning Private Limited

Delhi-110092

2013

QUANTITATIVE APTITUDE AND REASONING, Second Edition

R.V. Praveen

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Part II REASONING

SECTION A GENERAL MENTAL ABILITY

Chapter 1

Analogy

In the question based on analogy, there will be a particular relationship between the given two words. You have to identify the pair of words which are having the similar relationship among them.

Some useful points on the basic knowledge required for these tests are given below.

STUDY AND TOPIC RELATIONSHIP

Example: Anthropology : Man

We know that 'anthropology' is the study of man. Similar examples are:

- | | | | | | |
|-----------------|---|-------------|------------------|---|----------------|
| 1. Astrology | : | Future | 19. Occultism | : | Supernatural |
| 2. Botany | : | Plants | 20. Onomatology | : | Names |
| 3. Bryology | : | Bryophytes | 21. Ontology | : | Reality |
| 4. Cardiology | : | Heart | 22. Oology | : | Eggs |
| 5. Concology | : | Shells | 23. Ornithology | : | Birds |
| 6. Craniology | : | Skull | 24. Orography | : | Mountains |
| 7. Eccrinology | : | Secretions | 25. Paleography | : | Writings |
| 8. Entomology | : | Insects | 26. Paleontology | : | Fossils |
| 9. Ethnology | : | Human races | 27. Pathology | : | Diseases |
| 10. Hematology | : | Blood | 28. Pedology | : | Soil |
| 11. Herpetology | : | Amphibians | 29. Phycology | : | Algae |
| 12. Histology | : | Tissues | 30. Seismology | : | Earthquakes |
| 13. Ichthyology | : | Fishes | 31. Selenography | : | Moon |
| 14. Malacology | : | Molluscs | 32. Semantics | : | Language |
| 15. Mycology | : | Fungi | 33. Taxonomy | : | Classification |
| 16. Nephrology | : | Kidney | 34. Virology | : | Viruses |
| 17. Neurology | : | Nerves | 35. Zoology | : | Animals |
| 18. Nidology | : | Nests | | | |

WORKER AND TOOL RELATIONSHIP**Example:** Carpenter : Saw

A saw is a tool used by the carpenter.

Similar examples are:

| | | | | | |
|---------------|---|-------------|-----------------|---|-----------|
| 1. Astronomer | : | Telescope | 13. Labourer | : | Spade |
| 2. Author | : | Pen | 14. Lumberjack | : | Axe |
| 3. Barber | : | Scissors | 15. Mason | : | Plumbline |
| 4. Blacksmith | : | Anvil | 16. Painter | : | Brush |
| 5. Bricklayer | : | Trowel | 17. Sculptor | : | Chisel |
| 6. Butcher | : | Chopper | 18. Soldier | : | Gun |
| 7. Chef | : | Knife | 19. Surgeon | : | Scalpel |
| 8. Cobbler | : | Awl | 20. Tailor | : | Needle |
| 9. Doctor | : | Stethoscope | 21. Violinist | : | Bow |
| 10. Farmer | : | Plough | 22. Warrior | : | Sword |
| 11. Gardener | : | Harrow | 23. Wood cutter | : | Axe |
| 12. Jockey | : | Tack | | | |

TOOL AND ACTION RELATIONSHIP**Example:** Spade : Dig

A spade is used for digging.

Similar examples are:

| | | | | | |
|----------------|---|---------|--------------|---|-----------|
| 1. Auger | : | Bore | 10. Needle | : | Saw |
| 2. Axe | : | Grind | 11. Oar | : | Row |
| 3. Chisel | : | Carve | 12. Pen | : | Write |
| 4. Filter | : | Purify | 13. Shield | : | Guard |
| 5. Gun | : | Shoot | 14. Showel | : | Scoop |
| 6. Knife | : | Cut | 15. Spanner | : | Grip |
| 7. Loudspeaker | : | Amplify | 16. Spoon | : | Feed |
| 8. Mattock | : | Dig | 17. Sword | : | Slaughter |
| 9. Microscope | : | Magnify | 18. Steering | : | Drive |

WORK AND WORKING PLACE**Example:** Actor : Stage

An actor performs on a stage.

Similar examples are:

| | | | | | |
|---------------|---|----------|---------------|---|------------|
| 1. Artist | : | Theatre | 9. Gambler | : | Casino |
| 2. Beautician | : | Parlour | 10. Grocer | : | Shop |
| 3. Chef | : | Kitchen | 11. Lawyer | : | Court |
| 4. Clerk | : | Office | 12. Mechanic | : | Garage |
| 5. Doctor | : | Hospital | 13. Painter | : | Gallery |
| 6. Driver | : | Cabin | 14. Pilot | : | Cockpit |
| 7. Engineer | : | Site | 15. Sailor | : | Ship |
| 8. Farmer | : | Field | 16. Scientist | : | Laboratory |

| | | | | | |
|-------------|---|--------|-------------|---|--------------|
| 17. Servant | : | House | 20. Waiter | : | Restaurant |
| 18. Teacher | : | School | 21. Warrior | : | Battle field |
| 19. Umpire | : | Pitch | 22. Worker | : | Factory |

WORKER AND PRODUCT

Example: Producer : Film

A producer makes movies.

Similar examples are:

| | | | | | |
|------------------|---|-----------|---------------|---|-----------|
| 1. Architect | : | Design | 10. Farmer | : | Crop |
| 2. Author | : | Book | 11. Goldsmith | : | Ornaments |
| 3. Butcher | : | Meat | 12. Hunter | : | Prey |
| 4. Carpenter | : | Furniture | 13. Judge | : | Justice |
| 5. Chef | : | Food | 14. Mason | : | Wall |
| 6. Choreographer | : | Ballet | 15. Poet | : | Poem |
| 7. Cobbler | : | Shoes | 16. Tailor | : | Clothes |
| 8. Dramatist | : | Play | 17. Teacher | : | Education |
| 9. Editor | : | Newspaper | | | |

PRODUCT AND RAW MATERIAL

Example: Paper : Pulp

Paper is made from pulp.

Similar examples are:

| | | | | | |
|--------------|---|-----------|--------------|---|---------|
| 1. Book | : | Paper | 11. Omelette | : | Egg |
| 2. Butter | : | Milk | 12. Prism | : | Glass |
| 3. Cloth | : | Fibre | 13. Pullover | : | Wool |
| 4. Fabric | : | Yarn | 14. Road | : | Asphalt |
| 5. Furniture | : | Wood | 15. Rubber | : | Latex |
| 6. Jaggery | : | Sugarcane | 16. Sack | : | Jute |
| 7. Jewellery | : | Gold | 17. Shoes | : | Leather |
| 8. Linen | : | Flax | 18. Wall | : | Brick |
| 9. Metal | : | Ore | 19. Wine | : | Grapes |
| 10. Oil | : | Seed | | | |

INSTRUMENT AND MEASUREMENT

Example: Scale : Length

Similar examples are:

| | | |
|----------------|---|-----------|
| 1. Ammeter | : | Current |
| 2. Anemometer | : | Wind vane |
| 3. Balance | : | Mass |
| 4. Barometer | : | Pressure |
| 5. Hygrometer | : | Humidity |
| 6. Odometer | : | Speed |
| 7. Rain gauge | : | Rain |
| 8. Screw gauge | : | Thickness |

9. Seismography : Earthquakes
10. Sphygmomanometer : Blood pressure
11. Taseometer : Strains
12. Thermometer : Temperature

QUANTITY AND UNIT

Example: Time : Seconds

Second is the unit of time.

Similar examples are:

- | | | | | | |
|-------------------|---|---------|-----------------|---|----------|
| 1. Angle | : | Radians | 10. Mass | : | Kilogram |
| 2. Area | : | Hectare | 11. Potential | : | Volt |
| 3. Conductivity | : | Mho | 12. Power | : | Watt |
| 4. Current | : | Ampere | 13. Pressure | : | Pascal |
| 5. Energy | : | Joule | 14. Resistance | : | Ohm |
| 6. Force | : | Newton | 15. Temperature | : | Degrees |
| 7. Length | : | Metre | 16. Volume | : | Litre |
| 8. Luminosity | : | Candela | 17. Work | : | Joule |
| 9. Magnetic field | : | Oersted | | | |

ANIMALS AND YOUNG ONES

Example: Man : Child

The child is the young one of man.

Similar examples are:

- | | | | | | |
|--------------|---|--------------|--------------|---|--------|
| 1. Butterfly | : | Catterpillar | 8. Horse | : | Pony |
| 2. Cat | : | Kitten | 9. Insect | : | Larva |
| 3. Cow | : | Calf | 10. Lion | : | Cub |
| 4. Dog | : | Puppy | 11. Pig | : | Farrow |
| 5. Duck | : | Duckling | 12. Sheep | : | Lamb |
| 6. Frog | : | Tadpole | 13. Stallion | : | Colt |
| 7. Hen | : | Chicken | 14. Tortoise | : | Turtle |

MALE AND FEMALE

Example: Horse : Mare

Mare is the female horse.

Similar examples are:

- | | | | | | |
|--------------|---|---------|-------------|---|-----------|
| 1. Dog | : | Bitch | 6. Son | : | Daughter |
| 2. Drone | : | Bee | 7. Sorcerer | : | Sorceress |
| 3. Gentleman | : | Lady | 8. Stag | : | Doe |
| 4. Lion | : | Lioness | 9. Tiger | : | Tigress |
| 5. Nephew | : | Niece | | | |

WORD AND INTENSITY

Example: Anger : Rage

'Rage' is of higher intensity than 'anger'.

Similar examples are:

| | | | | | |
|-----------|---|----------|------------|---|--------|
| 1. Crime | : | Sin | 6. Quarrel | : | War |
| 2. Error | : | Blunder | 7. Refuse | : | Deny |
| 3. Famous | : | Renowned | 8. Sink | : | Drown |
| 4. Kindle | : | Burn | 9. Unhappy | : | Sad |
| 5. Moist | : | Drench | 10. Wish | : | Desire |

WORD AND SYNONYM

Example: Abode : Dwelling

'Abode' means almost the same as 'dwelling'. Thus, 'dwelling' is the synonym of 'abode'.

Similar examples are:

| | | | | | |
|--------------|---|-------------|----------------|---|---------|
| 1. Abduct | : | Kidnap | 11. Flaw | : | Defect |
| 2. Alight | : | Descend | 12. Haughty | : | Proud |
| 3. Assign | : | Allot | 13. House | : | Home |
| 4. Ban | : | Prohibition | 14. Mend | : | Repair |
| 5. Blend | : | Mix | 15. Presage | : | Predict |
| 6. Brim | : | Edge | 16. Presume | : | Assume |
| 7. Dearth | : | Scarcity | 17. Sedate | : | Calm |
| 8. Dissipate | : | Squander | 18. Solicit | : | Request |
| 9. Fallacy | : | Illusion | 19. Substitute | : | Replace |
| 10. Fierce | : | Violent | 20. Vacant | : | Empty |

WORD AND ANTONYM

Example: Gradual : Abrupt

'Abrupt' means sudden, which is the opposite of 'gradual'. Thus, 'abrupt' is the antonym of 'gradual'.

Similar examples are:

| | | | | | |
|-------------|---|---------|--------------|---|------------|
| 1. Advance | : | Retreat | 11. Fresh | : | Stale |
| 2. Affirm | : | Deny | 12. Gentle | : | Harsh |
| 3. Attack | : | Defend | 13. Ignore | : | Notice |
| 4. Best | : | Worst | 14. Initial | : | Final |
| 5. Chaos | : | Peace | 15. Kindle | : | Extinguish |
| 6. Condense | : | Expand | 16. Lend | : | Borrow |
| 7. Cordial | : | Hostile | 17. Lethargy | : | Alertness |
| 8. Create | : | Destroy | 18. Mourn | : | Rejoice |
| 9. Cruel | : | Kind | 19. Robust | : | Weak |
| 10. Deep | : | Shallow | 20. Sink | : | Float |

TYPE I: In this type of questions, two words are given. These words are related to each other in some way. Another word is also given. You have to find out the relationship between the first two words and choose the word from the given alternatives, which bear the same relationship to the third word.

EXAMPLE 1 Doctor : Diagnosis :: Judge : ?

- (a) Court (b) Punishment (c) Lawyer (d) Judgement

Solution As a doctor diagnoses a disease. Similarly, a judge give judgement. So, the answer is (d).

EXAMPLE 2 Bombay : Maharashtra :: Trivandrum?

- (a) Calcutta (b) Gujarat (c) Rajasthan (d) Kerala

Solution Bombay is the capital of Maharashtra. Similarly, Trivandrum is the capital of Kerala. So the answer is (d).

EXAMPLE 3 Conference : Chairman :: Newspaper : ?

- (a) Reporter (b) Distributor (c) Printer (d) Editor

Solution The chairman is the highest authority in a conference. Similarly, the editor is the highest authority in a newspaper agency. So the answer is (d).

EXERCISE 1

Directions: In each of the following questions, there is a certain relation between two words given on one side of :: and one word is given on the side of :: while another word is to be found from the given alternatives, having the same relation with this word as the given pair of words bear, choose the correct alternative.

1. Moon : Satellite :: Earth : ?

| | | | |
|---------|------------|------------------|--------------|
| (a) Sun | (b) Planet | (c) Solar system | (d) Asteroid |
|---------|------------|------------------|--------------|
2. Melt : Liquid :: Freeze : ?

| | | | |
|---------|--------------|-----------|-------------|
| (a) Ice | (b) Condense | (c) Solid | (d) Crystal |
|---------|--------------|-----------|-------------|
3. Influenza : Virus :: Typhoid : ?

| | | | |
|--------------|--------------|--------------|--------------|
| (a) Bacillus | (b) Parasite | (c) Protozoa | (d) Bacteria |
|--------------|--------------|--------------|--------------|
4. Eye : Myopia :: Teeth : ?

| | | | |
|---------------|--------------|--------------|------------|
| (a) Pyorrhoea | (b) Cataract | (c) Trachoma | (d) Eczema |
|---------------|--------------|--------------|------------|
5. Scribble : Write :: Stammer : ?

| | | | |
|----------|----------|-----------|-----------|
| (a) Walk | (b) Play | (c) Speak | (d) Dance |
|----------|----------|-----------|-----------|
6. Muslims : Mosque :: Sikhs : ?

| | | | |
|-------------------|------------|-----------------|---------------|
| (a) Golden temple | (b) Medina | (c) Fire temple | (d) Gurudwara |
|-------------------|------------|-----------------|---------------|
7. Acting : Theatre :: Gambling : ?

| | | | |
|------------|----------|---------|---------|
| (a) Casino | (b) Club | (c) Bar | (d) Gym |
|------------|----------|---------|---------|
8. Breeze : Cyclone :: Drizzle : ?

| | | | |
|----------------|-----------|-----------|--------------|
| (a) Earthquake | (b) Storm | (c) Flood | (d) Downpour |
|----------------|-----------|-----------|--------------|
9. Water : Convection :: Space : ?

| | | | |
|----------------|------------------|------------|---------------|
| (a) Conduction | (b) Transference | (c) Vacuum | (d) Radiation |
|----------------|------------------|------------|---------------|
10. Grain : Stock :: Stick ?

| | | | |
|----------|------------|----------------|------------|
| (a) Heap | (b) Bundle | (c) Collection | (d) String |
|----------|------------|----------------|------------|
11. Oxygen : Burn :: Carbon dioxide : ?

| | | | |
|-------------|----------|----------------|-------------|
| (a) Isolate | (b) Foam | (c) Extinguish | (d) Explode |
|-------------|----------|----------------|-------------|
12. Planet : Orbit :: Projectile : ?

| | | | |
|----------------|-----------|---------------|----------|
| (a) Trajectory | (b) Track | (c) Milky way | (d) Path |
|----------------|-----------|---------------|----------|
13. Cobbler : Leather :: Carpenter : ?

| | | | |
|---------------|----------|------------|-----------|
| (a) Furniture | (b) Wood | (c) Hammer | (d) Chair |
|---------------|----------|------------|-----------|

ANSWERS

1. (b) 2. (a) 3. (d) 4. (a) 5. (c) 6. (d) 7. (a) 8. (d) 9. (d) 10. (b)
 11. (c) 12. (a) 13. (b) 14. (d) 15. (d) 16. (b) 17. (a) 18. (c) 19. (b) 20. (a)
 21. (b) 22. (d) 23. (a) 24. (c) 25. (b) 26. (a) 27. (b) 28. (d) 29. (a) 30. (c)
 31. (c) 32. (a) 33. (b) 34. (c) 35. (c)

Explanations

1. The moon is a satellite and earth is a planet.
2. The first is the process of formation of the second.
3. The first is the disease caused by the second.
4. The second is a disease of the first.
5. The first is an improper form of the second.
6. Muslims worship in a mosque and Sikhs worship in a gurudwara.
7. The second is the place for performing the first.
8. The second is more intense than the first.
9. The second is the mode of transfer of heat by the first.
10. The second is a collection of the first.
11. Oxygen helps in burning whereas carbon dioxide extinguishes fire.
12. The second is the path traced by the first.
13. The second is the raw material used by the first.
14. The given words are opposites of each other.
15. The first is a young one of the second.
16. The second denotes the function performed by the first.
17. The President is the head of the country. Similarly, the Governor is the head of the state.
18. The first is temporarily parked in the second.
19. The first is produced by the action of the second.
20. Ruby is a red precious stone and sapphire is a blue precious stone.
21. The waste of the house is called garbage. Similarly, the impurities in the ore are called gangue.
22. The first is used to make the second.
23. The first is obtained from the second.
24. Darwin gave the theory of evolution. Likewise, Archimedes gave the principle of buoyancy.
25. The first attracts the second.
26. Glucose is a source of carbohydrates and soyabean is a source of proteins.
27. The second gives the pattern to be followed by the first.
28. A microphone makes the sound louder and a microscope magnifies an object.
29. The first implies killing the second.
30. The first is the left over of the second.
31. The first is used to make the second.
32. The second is the group or collection of the first.
33. The second is the place where first is made.
34. If oceans were deserts, waves would be sand dunes.
35. The given words are opposites of each other.

EXERCISE 2

Directions: In each of the following questions, there is a certain relation between two given words on one side of :: and one word is given on the other side of :: while another word is to be found from the given alternatives, having the same relation with this word as the given pair of words bear. Choose the best alternative.

1. Tea : Cup :: Tobacco : ?

| | | | |
|------------|------------|-----------|-------------|
| (a) Leaves | (b) Hookah | (c) Toxin | (d) Cheroot |
|------------|------------|-----------|-------------|
2. Pesticide : Crop :: Antiseptic : ?

| | | | |
|-----------|--------------|-------------|--------------|
| (a) Wound | (b) Clotting | (c) Bandage | (d) Bleeding |
|-----------|--------------|-------------|--------------|
3. Atom : Matter :: Particle : ?

| | | | |
|------------|--------------|--------------|----------|
| (a) Proton | (b) Electron | (c) Molecule | (d) Dust |
|------------|--------------|--------------|----------|
4. Disease : Pathology :: Planet : ?

| | | | |
|---------------|-------------|---------------|-------------------|
| (a) Astrology | (b) Geology | (c) Astronomy | (d) Palaeontology |
|---------------|-------------|---------------|-------------------|
5. Fire : Ashes :: Explosion : ?

| | | | |
|-----------|------------|----------|-----------|
| (a) Sound | (b) Debris | (c) Fury | (d) Flame |
|-----------|------------|----------|-----------|
6. Tuberculosis : Lungs :: Cataract : ?

| | | | |
|----------|------------|----------|----------|
| (a) Ears | (b) Throat | (c) Skin | (d) Eyes |
|----------|------------|----------|----------|
7. Professor : Lecture :: Doctor : ?

| | | | |
|--------------|-------------|--------------|-------------|
| (a) Hospital | (b) Disease | (c) Medicine | (d) Patient |
|--------------|-------------|--------------|-------------|
8. Victory : Encouragement :: Failure : ?

| | | | |
|-------------|------------|-----------|-----------------|
| (a) Sadness | (b) Defeat | (c) Anger | (d) Frustration |
|-------------|------------|-----------|-----------------|
9. Fossils : Creatures :: Mummies : ?

| | | | |
|-----------|------------------|-------------|-------------|
| (a) Egypt | (b) Human beings | (c) Animals | (d) Martyrs |
|-----------|------------------|-------------|-------------|
10. Ornithologist : Birds :: Anthropologist : ?

| | | | |
|------------|-------------|-------------|-----------------|
| (a) Plants | (b) Animals | (c) Mankind | (d) Environment |
|------------|-------------|-------------|-----------------|
11. Ocean : Pacific :: Island : ?

| | | | |
|---------------|-----------------|------------|------------|
| (a) Greenland | (b) Netherlands | (c) Island | (d) Borneo |
|---------------|-----------------|------------|------------|
12. Meat : Vegetarian :: Liquor : ?

| | | | |
|------------|---------------|-----------------|-------------|
| (a) Insane | (b) Introvert | (c) Teetotaller | (d) Foolish |
|------------|---------------|-----------------|-------------|
13. Accomodation : Rent :: Journey : ?

| | | | |
|-------------|------------|-------------|----------|
| (a) Expense | (b) Octroi | (c) Freight | (d) Fare |
|-------------|------------|-------------|----------|
14. Head : Cap :: Finger : ?

| | | | |
|-----------|-------------|----------|-----------|
| (a) Glove | (b) Thimble | (c) Nail | (d) Thumb |
|-----------|-------------|----------|-----------|
15. Proteins : Growth :: Carbohydrates : ?

| | | | |
|------------|--------------|----------------|--------------|
| (a) Energy | (b) Strength | (c) Resistance | (d) Diseases |
|------------|--------------|----------------|--------------|
16. Cells : Tissues :: Atoms : ?

| | | | |
|--------------|---------------|---------------|------------|
| (a) Elements | (b) Molecules | (c) Electrons | (d) Organs |
|--------------|---------------|---------------|------------|
17. Girl : Beautiful :: Boy : ?

| | | | |
|-----------|------------|----------------|--------------|
| (a) Smart | (b) Heroic | (c) Courageous | (d) Handsome |
|-----------|------------|----------------|--------------|
18. Taxonomy : Classification :: Pedology : ?

| | | | |
|------------|-------------|----------|--------------|
| (a) Nature | (b) Farming | (c) Soil | (d) Mountain |
|------------|-------------|----------|--------------|
19. Aeroplane : Cockpit :: Train : ?

| | | | |
|-----------|-----------|-----------------|------------|
| (a) Wagon | (b) Coach | (c) Compartment | (d) Engine |
|-----------|-----------|-----------------|------------|

20. Palaeography : Writings :: Ichthyology : ?
(a) Fishes (b) Whales (c) Oysters (d) Mammals

21. Bullet : Gun :: Smoke : ?
(a) Factory (b) Cigarette (c) Chimney (d) Fire

22. Wrist : Elbow :: Ankle : ?
(a) Heel (b) Fingers (c) Foot (d) Knee

23. Ottawa : Canada :: Canberra : ?
(a) Argentina (b) Switzerland (c) Sri Lanka (d) Australia

24. Leather : Cobbler :: Wood : ?
(a) Furniture (b) Cottage (c) Carpenter (d) Mason

25. Roentgen : X rays :: Becquerel : ?
(a) Uranium (b) Radioactivity (c) Fission (d) Superconductivity

ANSWERS

1. (d) 2. (a) 3. (d) 4. (c) 5. (b) 6. (d) 7. (c) 8. (d) 9. (b) 10. (c)
11. (a) 12. (c) 13. (d) 14. (b) 15. (a) 16. (b) 17. (d) 18. (c) 19. (d) 20. (a)
21. (c) 22. (d) 23. (d) 24. (c) 25. (b)

Explanations

1. Tea is contained in the cup. Similarly, tobacco is contained in cheroot.
 2. Pesticide protects crops from insects and antiseptic protects wounds from germs.
 3. The smallest unit of matter is atom and that of dust is particle.
 4. Pathology is the study of diseases. Similarly, astronomy is the study of planets.
 5. Ashes are the remains after a fire. Similarly, debris is the remains after an explosion.
 6. Tuberculosis is a disease of lungs. Similarly, cataract is a disease of eyes.
 7. Professor delivers lecture to his students. Similarly, Doctor gives medicine to his patients.
 8. Victory leads to encouragement and failure brings frustration.
 9. Fossils are the remains of creatures. Similarly, mummies are the remains of human beings.
 10. Ornithologist specialises in the study of birds. Similarly, anthropologist specialises in the study of mankind.
 11. The largest ocean is pacific ocean. Similarly, the largest island is greenland.
 12. A vegetarian never eats meat. Similarly, a teetotaller never drinks liquor.
 13. Money paid for accommodation is called rent. Similarly, the money paid for a journey is called fare.
 14. Head is covered by a cap. Similarly, finger is covered by a thimble.
 15. Proteins are essential for growth. Similarly, carbohydrates are essential for energy.
 16. Cells constitute tissues and atoms constitute molecules.
 17. 'Beautiful' describes the quality of prettiness in girls while 'handsome' describes the quality of prettiness in boys.
 18. Taxonomy is the science dealing with classification. Similarly, pedology deals with the study of soil.
 19. The pilot of an aeroplane sits in the cockpit. Likewise, the driver of a train works in the engine.

20. Palaeography is the study of ancient writings. Similarly, ichthyology is the study of fishes.
21. The first comes out of the second.
22. Wrist is the lower part of elbow. Similarly, ankle is the lower part of knee.
23. Ottawa is the capital of Canada and Canberra is the capital of Australia.
24. The first is the raw material required by the second.
25. Roentgen discovered X-rays. Similarly, Becquerel discovered radioactivity.

EXERCISE 3

Directions: In each of the following questions, there is a certain relation between two given words on one side of :: and one word is given on the other side of :: while another word is to be found from the given alternatives, having the same relation with this word as the given pair of words bear. Choose the best alternative.

1. Tectonics : Building :: Taxidermy : ?

| | | | |
|--------------------|----------------|--------------|----------------|
| (a) Classification | (b) Conserving | (c) Stuffing | (d) Collecting |
|--------------------|----------------|--------------|----------------|
2. Visitor : Invitation :: Witness : ?

| | | | |
|--------------|----------------|------------|--------------|
| (a) Subpoena | (b) Permission | (c) Assent | (d) Document |
|--------------|----------------|------------|--------------|
3. Mash : Horse :: Mast : ?

| | | | |
|---------|------------|----------------|---------|
| (a) Cow | (b) Monkey | (c) Chimpanzee | (d) Pig |
|---------|------------|----------------|---------|
4. Penology : Punishment :: Seismology : ?

| | | | |
|---------|-----------|-----------------|--------------|
| (a) Law | (b) Liver | (c) Earthquakes | (d) Medicine |
|---------|-----------|-----------------|--------------|
5. Wine : Grapes :: Perry : ?

| | | | |
|------------|-----------|-------------|------------------|
| (a) Whisky | (b) Pears | (c) Almonds | (d) Pomegranates |
|------------|-----------|-------------|------------------|
6. Pericardium : Heart :: Rind : ?

| | | | |
|----------|----------|-----------|----------|
| (a) Body | (b) Head | (c) Trees | (d) Teak |
|----------|----------|-----------|----------|
7. Eocrinology : Secretions :: Selenography : ?

| | | | |
|---------|----------|-----------|------------|
| (a) Sun | (b) Moon | (c) Crust | (d) Mantle |
|---------|----------|-----------|------------|
8. Anaemia : Blood :: Anarchy : ?

| | | | |
|--------------|--------------|----------------|-----------------|
| (a) Disorder | (b) Monarchy | (c) Government | (d) Lawlessness |
|--------------|--------------|----------------|-----------------|
9. Anatomy : Zoology :: Paediatrics : ?

| | | | |
|---------------|--------------|-------------------|---------------|
| (a) Chemistry | (b) Medicine | (c) Palaeontology | (d) Mechanics |
|---------------|--------------|-------------------|---------------|
10. Winter : Hibernation :: Summer : ?

| | | | |
|--------------|----------------|-----------------|-----------|
| (a) Survival | (b) Activation | (c) Aestivation | (d) Cache |
|--------------|----------------|-----------------|-----------|
11. Vegetable : Chop :: Body : ?

| | | | |
|---------|--------------|----------|-----------|
| (a) Cut | (b) Amputate | (c) Peel | (d) Prune |
|---------|--------------|----------|-----------|
12. Misogamy : Marriage :: Misogyny : ?

| | | | |
|--------------|-------------|---------------|-----------|
| (a) Children | (b) Husband | (c) Relations | (d) Women |
|--------------|-------------|---------------|-----------|
13. Eye : Wink :: Heart : ?

| | | | |
|----------|-----------|----------|------------|
| (a) Move | (b) Throb | (c) Pump | (d) Quiver |
|----------|-----------|----------|------------|
14. Virology : Virus :: Semantics : ?

| | | | |
|------------|--------------|------------|-------------|
| (a) Amoeba | (b) Language | (c) Nature | (d) Society |
|------------|--------------|------------|-------------|
15. Mattock : Digging :: Shovel : ?

| | | | |
|-----------|----------|-----------|-------------|
| (a) Break | (b) Push | (c) Scoop | (d) Whittle |
|-----------|----------|-----------|-------------|

ANSWERS

- 1.** (c) **2.** (a) **3.** (d) **4.** (c) **5.** (b) **6.** (c) **7.** (b) **8.** (c) **9.** (b) **10.** (c)
11. (b) **12.** (d) **13.** (b) **14.** (b) **15.** (c) **16.** (d) **17.** (d) **18.** (c) **19.** (b) **20.** (b)
21. (a) **22.** (b) **23.** (d) **24.** (b) **25.** (c) **26.** (c) **27.** (a) **28.** (a) **29.** (b) **30.** (c)

Explanations

1. Tectonics is the science dealing with the art of building. Similarly, taxidermy is the art of stuffing animals.
 2. A visitor is given an invitation to attend an occasion. Similarly, a witness is delivered a subpoena providing for attendance at the court.
 3. The first is a food for the second.
 4. Penology is the study of punishment. Similarly, seismology is the study of earthquakes.

5. Wine is made from grapes and perry is made from pears.
6. The first is a thick covering over the second.
7. Eccrinology is the study of secretions and Selenography is the study of moon.
8. Anaemia is the lack of blood. Similarly, Anarchy is the lack of government.
9. Anatomy is a branch of zoology. Likewise, Paediatrics is a branch of medicine.
10. Winter sleep of animals is called hibernation and summer sleep is called aestivation.
11. Cutting of vegetables is called chopping. Cutting of a body part is called amputating.
12. The first is a hatred for the second.
13. The second is the movement of the first.
14. Virology deals with the effect of virus. Similarly, semantics deals with the effects of language.
15. Mattock is a tool for digging hard ground. Similarly, shovel is a tool to scoop.
16. The first is a disease of the second.
17. Pituitary is a gland in the brain. Similarly, thymus is a gland of the chest.
18. Roster is a list of duties and inventory is a list of goods.
19. The given words are synonyms of each other.
20. Funk discovered vitamins and Curie discovered radium.
21. Gold is mined in Karnataka. Likewise, diamonds are mined in Madhya Pradesh.
22. Dum Dum is an Airport in Kolkata and Palam is an Airport in Delhi.
23. Seismograph is an instrument to measure the intensity of an earthquake. Similarly, taseometer is an instrument to measure strains.
24. The second is the young one of the first.
25. The first is a part of the second.
26. Calendar is a list of dates. Likewise, dictionary is a collection of words.
27. Shark is a fish and lavender is a shrub.
28. The given words are synonyms of each other.
29. The first is a part of the second.
30. Probe is an instrument to examine a wound. Similarly, anemograph is an instrument for recording force.

TYPE II: In this type of questions, a pair of words is followed by four pairs of words as alternatives. You have to choose the pair of words in which the words bear the same relationship to each other.

EXAMPLE 4 Balance : Weigh

- | | |
|----------------------------|--------------------------|
| (a) Aeroplane : Height | (b) Radar : Detection |
| (c) Satellite : Revolution | (d) Television : Picture |

Solution A balance is used to weigh. Similarly, a radar is used for detection.
Hence the answer is (b).

EXAMPLE 5 Cells : Cytology

- | | |
|---------------------------|--------------------------|
| (a) Worms : Ornithology | (b) Insects : Entomology |
| (c) Diseases : Physiology | (d) Tissues : Morphology |

Solution The study of cells is called cytology. Similarly, the study of insects is called entomology.

Hence the answer is (b).

EXAMPLE 6 Chisel : Sculptor

- | | |
|-----------------------|------------------------|
| (a) Scooter : Rider | (b) Brush : Teeth |
| (c) Scalpel : Surgeon | (d) Knife : Woodcutter |

Solution Chisel is a tool used by a sculptor. Similarly, scalpel is a tool used by a surgeon. Hence the answer is (c).

EXERCISE 4

Directions: The following questions consist of two words each that have a certain relationship to each other, followed by four lettered pairs of words. Select the lettered pair that has the same relationship as the original pair of words.

1. Birds : Aves

| | |
|---------------------|-----------------------|
| (a) Fish : Water | (b) Whale : Fish |
| (c) Lizard : Insect | (d) Man : Homosapiens |
2. Dusk : Night

| | |
|-------------------------|--------------------|
| (a) Afternoon : Evening | (b) Infant : Child |
| (c) Walk : Run | (d) Day : Light |
3. Triangle : Hexagon

| | |
|-------------------------|---------------------------|
| (a) Cone : Sphere | (b) Rectangle : Octagon |
| (c) Pentagon : Heptagon | (d) Angle : Quadrilateral |
4. Shield : Soldier

| | |
|--------------------------|--------------------|
| (a) Stethoscope : Doctor | (b) Book : Author |
| (c) Advocate : Court | (d) Helmet : Rider |
5. Pesticide : Plant

| | |
|-------------------------|------------------------|
| (a) Injection : Disease | (b) Vaccination : Body |
| (c) Medicine : Cure | (d) Teacher : Student |
6. Cloth : Texture

| | |
|-------------------|----------------------|
| (a) Body : Weigh | (b) Silk : Cloth |
| (c) Wood : Grains | (d) Ornaments : Gold |
7. House : Ceiling

| | |
|--------------------|----------------------|
| (a) Hut : Roof | (b) Building : Floor |
| (c) Bed : Bedsheet | (d) Grapes : Wine |
8. Fish : Aquarium

| | |
|----------------------|--------------------|
| (a) Teacher : Hostel | (b) Bee : Apiary |
| (c) Bird : Nest | (d) Child : School |
9. Dog : Kennel

| | |
|----------------------|----------------------|
| (a) Horse : Carriage | (b) Sheep : Flock |
| (c) Cow : Barn | (d) Sports : Stadium |
10. Paper : Ream

| | |
|------------------|-------------------|
| (a) Eggs : Dozen | (b) Books : Pile |
| (c) Twigs : Bush | (d) Food : Packet |
11. Explosion : Destruction

| | |
|-------------------------|---------------------------|
| (a) Talk : Exaggeration | (b) Girl : Woman |
| (c) Success : Failure | (d) Engagement : Marriage |

-
12. Identity : Anonymity
(a) Flaw : Perfection
(c) Truth : Lie
13. Sigh : Relief
(a) Tear : Joy
(c) Carelessness : Accident
14. Ecstasy : Pleasure
(a) Hatred : Affection
(c) Rage : Anger
15. Range : Mountain
(a) Point : Line
(c) School : Class
16. Spring : Summer
(a) Adolescence : Youth
(c) Stagger : Walk
17. Teeth : Dentist
(a) Legs : Philanthropist
(c) Operation : Surgeon
18. Textile : Mill
(a) Eggs : Hen
(c) Food : Agriculture
19. Shoes : Cobbler
(a) Spectacles : Optician
(c) Oxygen : Plant
20. Symphony : Music
(a) Mural : Painting
(c) Preface : Book
21. Numismatist : Coins
(a) Philatelist : Stamps
(c) Cartographer : Maps
22. Embroider : Cloth
(a) Patch : Quilt
(c) Carve : Knife
23. Curtain : Drapery
(a) Cockroach : Insect
(c) Pillow : Cushion
24. Theft : Confess
(a) Fight : Dare
(c) Murder : Commit
25. Crown : Royal
(a) Throne : Regal
(c) Pen : Author
- (b) Careless : Mistake
(d) Fear : Joy
- (b) Trembling : Fear
(d) Sweat : Hot
- (b) Joy : Grief
(d) Mumble : Speak
- (b) Bouquet : Flower
(d) String : Bead
- (b) Fight : Battle
(d) Read : Learn
- (b) Eyes : Occulist
(d) Sight : Spectator
- (b) Coal : Mine
(d) Brick : Kiln
- (b) Education : Teacher
(d) Food : Kitchen
- (b) Ode : Prose
(d) Editorial : Journal
- (b) Jeweller : Jewels
(d) Geneticist : Chromosomes
- (b) Stain : Glass
(d) Chase : Metal
- (b) Bedsheet : Bed
(d) Mat : Floor
- (b) Fault : Admit
(d) Mistake : Agree
- (b) Wrap : Ermine
(d) Crucifix : Religion

26. Cattle : Drove
(a) Soldier : Crew
(c) Chicken : Brood

(b) Grain : Bundle
(d) Bees : Heap

27. Meadow : Sheep
(a) Stable : Horse
(c) Grass : Grasshopper

(b) Hay : Insect
(d) Pasture : Cattle

28. Friendly : Inimical
(a) Lithosphere : Hydrosphere
(c) Abstain : Refrain

(b) Condemnation : Approval
(d) Disappointment : Embarrassment

29. Modesty : Arrogance
(a) Passion : Emotion
(c) Cause : Purpose

(b) Practice : Perfection
(d) Debility : Strength

30. Traitor : Disloyalty
(a) Executioner : Reliability
(c) Manager : Administration

(b) Rebel : Defiance
(d) Hope : Pessimism

ANSWERS

- 1.** (d) **2.** (b) **3.** (b) **4.** (d) **5.** (b) **6.** (c) **7.** (a) **8.** (b) **9.** (c) **10.** (a)
11. (d) **12.** (a) **13.** (b) **14.** (c) **15.** (d) **16.** (a) **17.** (b) **18.** (d) **19.** (a) **20.** (a)
21. (a) **22.** (d) **23.** (a) **24.** (b) **25.** (d) **26.** (c) **27.** (d) **28.** (b) **29.** (d) **30.** (b)

(Explanations)

1. Birds belong to the class of Aves. Similarly, man belongs to the class of Homosapiens.
 2. Dusk is the initial stage of night. Similarly, infant is the initial stage of child.
 3. The number of sides in the second figure in both the pairs is twice that in the first.
 4. Shield is a defensive instrument for a soldier. Likewise, helmet is a defensive instrument for a rider.
 5. Pesticide is meant to protect a plant from diseases. Similarly, vaccination is meant to protect the body from diseases.
 6. The quality of cloth is identified by its texture and that of wood by grains.
 7. Ceiling is the top part of a house. Likewise, roof is the top part of a hut.
 8. Fishes are kept and reared in an aquarium. Similarly, bees are reared in an apiary.
 9. Kennel is the home for a dog. Likewise, barn is the home for cows.
 10. The paper is bought in reams. Similarly, eggs are bought in dozen.
 11. Explosion is followed by destruction. Similarly, engagement is followed by marriage.
 12. A lack of identity is anonymity. Similarly, a lack of flaw is perfection.
 13. Sigh is a sign of relief. Similarly, trembling is a sign of fear.
 14. The first is the higher intensity of second.
 15. The first is the name given to a continuous chain of the second.
 16. Spring is followed by summer. Similarly, adolescence is followed by youth.
 17. The teeth are examined by a dentist. Likewise, eyes are examined by an oculist.
 18. Textiles are manufactured in a mill. Similarly, bricks are manufactured in kiln.

19. Shoes are made by a cobbler. Similarly, spectacles are designed by an optician.
 20. Symphony is a type of music. Similarly, mural is a type of painting.
 21. A numismatist collects coins. Similarly, a philatelist collects stamps.
 22. A pattern is embroidered on a cloth and chased on a metal.
 23. Curtain belongs to the class of drapery. Similarly, cockroach belongs to the class of insects.
 24. Theft is confessed and fault is admitted.
 25. Crown is a symbol of royalty. Similarly, crucifix is a mark of religion.
 26. Drove is a group of cattle. Similarly, brood is a group of chickens.
 27. Sheep graze in a meadow. Similarly, cattle graze in a pasture.
 28. The words in each pair are antonyms of each other.
 29. The words in each pair are antonyms of each other.
 30. The second is the defining characteristic of the first.

EXERCISE 5

Directions: Each of the following questions consists of two words which have a certain relationship to each, followed by four pairs of words. Select the pair which has the same relationship as the original pair of words.

1. Magazine : Periodical
(a) Gun : Soldier
(c) Pun : Joke
 2. Heart : Cardiology
(a) Brain : Psychology
(c) Civics : Polity
 3. Doctor : Hospital
(a) Plumber : Wrench
(c) Water : Reservoir
 4. Flag : Nation
(a) Emblem : Prosperity
(c) Wealth : Prestige
 5. Coin : Mint
(a) Grain : Field
(c) Wine : Brewery
 6. Infection : Illness
(a) Satisfaction : Appetite
(c) Antidote : Disease
 7. Sheep : Mutton
(a) Duck : Roast
(c) Deer : Venison
 8. Yen : Currency
(a) Brass : Metal
(c) Paper : Book
 9. Cricket : Football
(a) Solid : Liquid
(c) Prose : Poetry
 10. (b) Harvesting : Agriculture
(d) Truck : Transport
 11. (b) History : Histology
(d) Fossils : Palaeontology
 12. (b) Chef : Kitchen
(d) Farmer : Village
 13. (b) Insignia : Rank
(d) Honour : Status
 14. (b) Hay : Stable
(d) Book : Publisher
 15. (b) Applause : Audience
(d) Rehearsal : Performance
 16. (b) Hen : Poultry
(d) Lamb : Veal
 17. (b) Flower : Fragrance
(d) Karnataka : State
 18. (b) Hockey : Ball
(d) Shoe : Gloves

10. Geology : Earth
(a) Architect : Building
(c) Aquarium : Fish
11. Carpenter : Furniture
(a) Teacher : Teaching
(c) Mason : Wall
12. Traveller : Destination
(a) Beggar : Donation
(c) Teacher : Education
13. Horns : Bull
(a) Mane : Lion
(c) Hoofs : Horse
14. Taxonomist : Classify
(a) Haggler : Bargain
(c) Kind : Alms
15. Horse : Equine
(a) Lion : Carnivorous
(c) Table : Furniture
16. Wife : Marriage
(a) Bank : Money
(c) Service : Qualification
17. Sprain : Fracture
(a) Cool : Cold
(c) Pneumonia : Fever
18. Ampere : Current
(a) Sound : Waves
(c) Distance : Kilometre
19. Eyes : Tears
(a) Sea : Water
(c) Heart : Astery
20. Bread : Flour
(a) Train : Wagon
(c) Road : Asphalt
21. Jupiter : Planet
(a) Sparrow : Bird
(c) Chilka : Lake
22. Kitchen : Bedroom
(a) Woman : Man
(c) Botany : Zoology
23. Buoy : Channel
(a) White line : High way
(c) Red light : Street
(b) Biology : Science
(d) Archaeology : Artifacts
(b) King : Empire
(d) Farmer : Agriculture
(b) Accident : Hospital
(d) Refugee : Shelter
(b) Antlers : Stag
(d) Wattles : Turkey
(b) Doctor : Medicine
(d) Engineer : Building
(b) Cat : Feline
(d) Dog : Vulpine
(b) Nationality : Citizenship
(d) Attendance : Register
(b) Accident : Death
(d) Fall : Slip
(b) Speed : Time
(d) Ohm : Resistance
(b) Volcano : Lava
(d) Hunger : Bread
(b) Car : Engine
(d) House : Wall
(b) Yamuna : River
(d) Everest : Peak
(b) Vegetable : Fruit
(d) Gas : Cylinder
(b) Light house : Ship
(d) Road map : Travel

24. Knowledge : Ignorance
(a) Cure : Health
(c) Breath : Suffocation
(b) Conceal : Hide
(d) Construction : Wall

25. Dove : Peace
(a) Crow : Scavenge
(c) Lull : Storm
(b) Knife : Cut
(d) Pearl : Purity

26. Calligraphy : Writing
(a) Music : Song
(c) Drama : Prose
(b) Lyric : Poem
(d) Chapter : Stanza

27. Conciliatory : Friendliness
(a) Cache : Hide
(c) Timid : Bold
(b) Garrulous : Old
(d) Obvious : Explain

28. Wick : Candle
(a) Lead : Pencil
(c) Light : Darkness
(b) Thread : Wool
(d) Quick : Rapid

29. Gypsy : Caravan
(a) Hare : Byre
(c) Monk : Temple
(b) Knight : Mansion
(d) Convict : Cell

30. Plaintiff : Defendant
(a) Judge : Jury
(c) Attorney : Lawyer
(b) Court : Law
(d) Injured : Accused

ANSWERS

- 1.** (c) **2.** (d) **3.** (b) **4.** (b) **5.** (c) **6.** (d) **7.** (c) **8.** (d) **9.** (c) **10.** (d)
11. (c) **12.** (d) **13.** (b) **14.** (a) **15.** (b) **16.** (c) **17.** (a) **18.** (d) **19.** (b) **20.** (c)
21. (d) **22.** (c) **23.** (a) **24.** (c) **25.** (d) **26.** (b) **27.** (a) **28.** (a) **29.** (b) **30.** (d)

Explanations

1. Magazine is a type of periodical. Likewise, pun is a type of joke.
 2. The study of heart is called cardiology. Similarly, the study of fossils is palaeontology.
 3. A doctor works in a hospital. Similarly, a chef works in a kitchen.
 4. Flag is the symbol of nation. Similarly, insignia is the symbol of rank.
 5. Coin is made in a mint. Similarly, wine is made in a brewery.
 6. Infection is followed by illness. Similarly, rehearsal is followed by performance.
 7. The flesh of sheep is called mutton. Similarly, the flesh of a deer is called venison.
 8. Yen is a currency. Likewise, Karnataka is a state.
 9. Both cricket and football belongs to the same class of sports. Similarly, both prose and poetry belong to the same class of literature.
 10. Geology is the study of earth. Likewise, archaeology is the study of artifacts.
 11. A carpenter makes furniture. Similarly, a mason builds a structure.
 12. A traveller seeks destination. Similarly, a refugee seeks shelter.
 13. A bull bears horns on its head. Likewise, a stag bears antlers on its head.
 14. A taxonomist classifies and a haggle bargains.

15. Equine is a horse like animal. Similarly, feline is a cat-like animal.
16. The second is necessary to acquire the first.
17. The second is more intensive form of the first.
18. Ampere is the unit of current. Similarly, Ohm is the unit of resistance.
19. Tears come out of the eye. Similarly, lava comes out of a volcano.
20. Bread is made of flour. Similarly, road is made of asphalt.
21. Jupiter is the largest planet. Similarly, Everest is the highest peak.
22. Both are parts of the same. Kitchen and bedroom are the parts of house. Similarly, botany and zoology are the branches of science.
23. A buoy indicates channel or a path for a ship to follow, white line shows the path on a highway to be followed by vehicles.
24. One is the opposite of the other.
25. Dove is a symbol of peace. Similarly, pearl is a symbol of purity.
26. Calligraphy is a type of writing. Similarly, lyric is a type of poem.
27. The words in both the pairs are synonyms of each other.
28. The uppermost working part of a candle is the wick. Likewise, the working part of a pencil is lead.
29. Gypsy stays in a caravan. Similarly, a knight stays in a mansion.
30. Injured is the plaintiff and the accused is the defendant.

EXERCISE 6

Directions: The following questions consist of two words each that have a certain relationship to each other followed by four lettered pairs of words. Select the lettered pair that has the same relationship as the original pair of words.

1. Read : Legible

| | |
|---------------------|--------------------------|
| (a) Hear : Audible | (b) Qualify : Eligible |
| (c) See : Illegible | (d) Require : Admissible |
2. Locks : Warble

| | | | |
|--------------------|------------------|-----------------|-------------------|
| (a) Crows : Cackle | (b) Tiger : Yelp | (c) Owls : Hoot | (d) Camel : Bleat |
|--------------------|------------------|-----------------|-------------------|
3. Horse : Mare

| | | | |
|------------------|-----------------|-------------------|-----------------|
| (a) Duck : Geese | (b) Dog : Puppy | (c) Donkey : Pony | (d) Fox : Vixen |
|------------------|-----------------|-------------------|-----------------|
4. Water : Thirst

| | | | |
|--------------------|----------------------|---------------------|--------------------|
| (a) Ripe : Harvest | (b) Book : Ignorance | (c) Needle : Stitch | (d) Rain : Drought |
|--------------------|----------------------|---------------------|--------------------|
5. Iodine : Goitre

| | |
|----------------------------|---------------------|
| (a) Insuline : Diabetes | (b) Mango : Anaemia |
| (c) Hormones : Haemophilia | (d) Fat : Obesity |
6. Waiter : Tip

| | |
|----------------------|--------------------|
| (a) Student : Marks | (b) Worker : Bonus |
| (c) Employee : Wages | (d) Clerk : Bribe |
7. Kangaroo : Australia

| | |
|--------------------------|-----------------------|
| (a) Whale : River | (b) Elephant : Russia |
| (c) Penguin : Antarctica | (d) India : Peacock |
8. Hitler : Germany

| | |
|---------------------------|----------------------------|
| (a) Shakespeare : England | (b) Mussolini : Italy |
| (c) Tulsidas : India | (d) Boris Yeltsin : Russia |

- 9.** Artist : Troupe
 (a) Market : Crowd (b) Flowers : Garland (c) Singer : Chorus (d) Fishes : Pond
- 10.** Pulp : Paper
 (a) Rope : Hemp (b) Rayon : Cellulose (c) Thread : Needle (d) Yarn : Fabric
- 11.** Hook : Fish
 (a) Stadium : Games (b) Glove : Ball (c) Symphony : Music (d) Word : Alphabet
- 12.** Graphite : Lubricant
 (a) Movement : Friction (b) Iron : Steel
 (c) Wool : Cloth (d) Diamond : Abrasive
- 13.** Stage : Theatre
 (a) Bedroom : House (b) Car : Road (c) Patient : Hospital (d) School : Education
- 14.** Coffee : Beverages
 (a) Bread : Butter (b) Milk : Tea (c) Burger : Snacks (d) Grapes : Wine
- 15.** Cricket : Pitch
 (a) Ship : Dock (b) Boat : Harbour (c) Wrestling : Track (d) Boxing : Ring
- 16.** Monk : Monastery
 (a) Noble : House (b) Lion : Hole (c) Nun : Convent (d) Peasant : Village
- 17.** Lamb : Frisk
 (a) Deer : Swoop (b) Cat : Steal (c) Bear : Leap (d) Lion : Stride
- 18.** Laboratory : Germs
 (a) School : Students (b) Playground : Games
 (c) Library : Books (d) Observatory : Planets
- 19.** Mongoose : Snake
 (a) Milk : Goat (b) Fish : Crane (c) Whale : Crow (d) Water : Sky
- 20.** Duralumin : Aircraft
 (a) Brass : Alloy (b) Stone : Sculptor (c) Iron : Steel (d) Bronze : Statue
- 21.** Termite : Wood
 (a) Neem : Cotton (b) Fibre : Jute (c) Thread : Cloth (d) Moth : Wool
- 22.** Introduction : Conclusion
 (a) Salutation : Farewell (b) Deposit : Take
 (c) Companion : Scoundrel (d) Mingle : Emerge
- 23.** Plants : Coal
 (a) Crops : Manure (b) Animals : Oil (c) Cow : Milk (d) Fire : Smoke
- 24.** Lawn : Grass
 (a) Wool : Sheep (b) Skin : Goat (c) Fur : Pelt (d) Rice : Farm
- 25.** Cistern : Water
 (a) House : Family (b) Cup : Tea (c) Vase : Water (d) Book : Knowledge
- 26.** Preamble : Constitution
 (a) Word : Dictionary (b) Contents : Magazine
 (c) Explanation : Poetry (d) Preface : Book
- 27.** Revolution : Change
 (a) Disease : Medicine (b) Famous : Notorious
 (c) Food : Energy (d) Treaty : Peace

28. Coronation : Reign
(a) Vaccination : Immunity (b) Sculptor : Statue
(c) Degree : Graduate (d) Summer : Rain
29. Leather : Milk
(a) Cat : Mouse (b) Curd : Bacteria (c) Fruit : Rubber (d) Sun : Moon
30. Loud : Cape
(a) House : Gate (b) Foot : Toe (c) Hand : Glove (d) Finger : Nails
31. Sailor : Pirate
(a) Police : Robbers (b) Lion : Lamb (c) Plant : Fungus (d) Major : Sepoy
32. Pharaohs : Egypt
(a) Socrates : Greece (b) Kings : India
(c) Imperator : Rome (d) Government : State
33. Basement : Attic
(a) Nadir : Zenith (b) Zenith : Apex (c) Zenith : Root (d) Apex : Pinnacle
34. Lok Sabha : Legislature
(a) President : Executive (b) Minister : Meeting
(c) Judge : Court (d) People : Election
35. Blister : Skin
(a) Sore : Toe (b) Sty : Eye (c) Ball : Pitcher (d) Wound : Arm
36. Energy : Dissipate
(a) Power : Generator (b) Food : Hunger
(c) Money : Squander (d) Battery : Charge
37. Optimistic : Pessimistic
(a) Difficult : Impossible (b) Study : Play
(c) Tolerating : Disgusting (d) Export : Import
38. Acquire : Inherit
(a) Profit : Loss (b) Learn : Discover
(c) Instinct : Habit (d) Hierarchical : Succession
39. Protagonist : Character
(a) Earth : Moon (b) Termite : Insect (c) Lizard : Housefly (d) Whale : Fish
40. Bird : Wings
(a) Whale : Water (b) Dog : Lungs (c) Car : Wheel (d) Pen : Paper
41. War : Destruction
(a) Fire : Burn (b) Court : Justice (c) Water : Drown (d) Food : Hunger
42. Elevation : Depression
(a) Pen : Notebook (b) Intelligence : Stupidity
(c) School : Education (d) Doctor : Medicine
43. Dawn : Morning
(a) Morning : Evening (b) Sun : Rain
(c) Lamp : Light (d) Autumn : Winter
44. Question : Question mark
(a) Remark : Colon (b) Aside : Parentheses
(c) Sentence : Period (d) Clause : Semicolon

45. Medicine : Capsule
(a) Pearl : shell (b) Passenger : Bus (c) Heart : Lungs (d) Car : Vehicle
46. Liquor : Intoxicates
(a) Oil : Smears (b) Medicine : Soothes
(c) Drug : Addicts (d) Morphine : Sedates
47. Acoustics : Sound
(a) Mathematics : Geometry (b) Radio : Song
(c) Pathology : Disease (d) Communication : Phone
48. Large : Enormous
(a) Big : Small (b) Plump : Fat (c) Less : Greater (d) Regal : Royal
49. Vaseline : Petrol
(a) Tea : Leaves (b) Plant : Tree (c) Butter : Ghee (d) Cream : Milk
50. Jute : Sack
(a) Shoe : Sock (b) Wool : Sweater (c) Cotton : Fibre (d) Mill : Cloth
51. Square : Cube
(a) Triangle : Pyramid (b) Circle : Sphere
(c) Line : Cylinder (d) Sphere : Earth
52. Coal : Thermal
(a) Power : Energy (b) Bulb : Light (c) Air : Atmosphere (d) Water : Hydel
53. Carnivore : Herbivore
(a) Animal : Bird (b) Flesh : Plant (c) Camel : Giraffe (d) Horse : Lion
54. Equator : Latitude
(a) Visitor : Guest (b) Needle : Direction (c) Fish : Water (d) Pigeon : Bird
55. Calendar : Date
(a) Time : Hour (b) Transport : Bus (c) Dictionary : Word (d) City : Pincode
56. Court : Justice
(a) Police : Crime (b) Teacher : Study (c) Doctor : Sickness (d) Auditor : Accuracy
57. Fan : Sweat
(a) Fire : Smoke (b) Rain : Drought
(c) Wind : Evaporation (d) Crop : Harvest
58. Spider : Web
(a) Ink : Pen (b) Cock : Hen (c) Teacher : Student (d) Poet : Poetry
59. Apostate : Religion
(a) Potentate : Kingdom (b) Traitor : Country
(c) Bureaucrat : Government (d) Jailor : Law
60. Ribs : Lungs
(a) Heart : Artery (b) Fingers : Hands (c) Tongue : Mouth (d) Shell : Nut
61. Editor : Magazine
(a) Director : Film (b) Novel : Writer
(c) Psychiatrist : Neurotic (d) Librarian : Library
62. Hermit : Solitude
(a) Warrior : Civility (b) Traitor : Loyalty
(c) Ascetic : Self denial (d) Researcher : Finding

ANSWERS

- | | | | | | | | | | |
|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| 1. (a) | 2. (c) | 3. (d) | 4. (d) | 5. (a) | 6. (b) | 7. (c) | 8. (b) | 9. (c) | 10. (d) |
| 11. (b) | 12. (d) | 13. (a) | 14. (c) | 15. (d) | 16. (c) | 17. (b) | 18. (d) | 19. (b) | 20. (d) |
| 21. (d) | 22. (a) | 23. (b) | 24. (c) | 25. (b) | 26. (d) | 27. (d) | 28. (d) | 29. (c) | 30. (b) |
| 31. (c) | 32. (b) | 33. (a) | 34. (a) | 35. (b) | 36. (c) | 37. (d) | 38. (d) | 39. (b) | 40. (c) |
| 41. (a) | 42. (b) | 43. (d) | 44. (b) | 45. (a) | 46. (d) | 47. (c) | 48. (b) | 49. (d) | 50. (b) |
| 51. (a) | 52. (d) | 53. (b) | 54. (d) | 55. (c) | 56. (d) | 57. (b) | 58. (d) | 59. (b) | 60. (d) |
| 61. (a) | 62. (c) | 63. (a) | 64. (c) | 65. (d) | | | | | |

Explanations

1. Legible means able to be read. Similarly, audible means able to be heard.
 2. The second is the sound produced by the first.
 3. The second is the female of the first.
 4. The lack of water is thirst. Similarly, the lack of rain is drought.
 5. The lack of first causes the second.
 6. The second is the additional money given to the first for good service.
 7. Kangaroo is the native of Australia. Similarly, penguin is the native of Antarctica.
 8. Hitler was a tyrant belonging to Germany. Similarly, Mussolini was a tyrant belonging to Italy.
 9. A group of artists is called a troupe. Likewise, a group of singers is called chorus.
 10. Pulp is used to make paper. Likewise, yarn is used to make fabric.
 11. The first helps to catch the second.
 12. Graphite is used as a lubricant. Similarly, diamond is used as an abrasive.
 13. The first is a part of the second.
 14. The first one is specific and the second is the class to which it belongs.
 15. The game of cricket is played on a pitch. Similarly, the game of boxing is performed in a ring.
 16. The second is the dwelling place of the first.
 17. The second denotes the manner of walking of the first.
 18. A laboratory is a place to study germs. Similarly, observatory is a place of studying planets.
 19. The first is eaten by the second.
 20. The first is used to make the second.
 21. The first damages the second.
 22. The given words are opposite to each other.
 23. Plants on decay yield coal. Similarly, animals on decay produce oil.

24. The second grows on the first.
25. The first is used to hold the second.
26. Preamble is the introduction to the constitution and mentions its main ideals and objectives. Similarly, preface is the introduction to a book.
27. The first brings the second.
28. The first is followed by the second.
29. Leather and milk are both obtained from animals. Similarly, fruit and rubber are both obtained from trees.
30. Cape is the projection of land. Similarly, toe is the projection of foot.
31. Both belong to the same species but first one is useful and the second one is harmful.
32. The rulers of Egypt were known as pharaohs. Similarly, the rulers of India were known as kings.
33. Nadir (lowest point) and zenith (highest point) can be compared to basement and attic respectively.
34. Lok Sabha is a part of the Legislature. Likewise, President is a part of the Executive.
35. Blister is an infection of the skin. Similarly, sty is an infection of the eye.
36. 'Dissipate' and 'squander' are synonyms of 'waste'. Just as energy can be dissipated, money can be squandered.
37. The given words are opposite to each other.
38. Each pair consists of synonyms.
39. Protagonist is a character. Similarly, termite is an insect.
40. The second is used by the first for movement.
41. The first one causes the second.
42. The given words are opposites to each other.
43. Dawn is followed by morning. Similarly autumn is followed by winter.
44. The second is the symbol used at the end of first.
45. Medicine is contained in capsule. Similarly, pearl is contained in a shell.
46. The second is the effect of the first after consumption.
47. Acoustics is the science of sound. Similarly, pathology is the study of diseases.
48. Enormous is the extreme of large. Similarly, fat is the extreme of plump.
49. Vaseline is extracted from petrol. Similarly, cream is extracted from milk.
50. Sack is made up of jute. Similarly, sweater is made up of wool.
51. Each face of a cube is a square and each face of a pyramid is a triangle.
52. Coal produces thermal energy. Similarly, water produces hydel energy.
53. Flesh eating creatures are carnivore and plant eating creatures are herbivore.
54. The first one is specific and the second one is the class to which the first belongs. Equator is a line of latitude; pigeon is a bird.
55. Just as calendar consists of dates in an organised way; dictionary consists of words in an organised way.
56. The duty of court is to dispense justice. The duty of an auditor is to provide accuracy in financial matters.
57. The second is ceased due to the first.
58. As spider makes web, poet makes poetry.
59. The first rebels against the second.
60. Ribs are the bones, which protect the lungs. Similarly, shell protects the nut.

61. Just as all the articles of a magazine are interpreted by the editor, in the same way all the actions of film are interpreted by director.
62. A hermit leads a life of solitude. Likewise, an ascetic leads a life of self-denial.
63. The Taj Mahal is located in Agra. Similarly, Eiffel Tower is located in Paris.
64. The Jews worship in a synagogue. Likewise, the Buddhists worship in a pagoda.
65. Script is a written instruction of drama. Similarly, score is a written piece of symphony (type of music).

EXERCISE 7

1. A sword is related to *slaughter* in the same way *scalpel* is related to _____.
 (a) murder (b) stab (c) surgery (d) chopping
2. *Ecology* is related to *environment* in the same way *histology* is related to _____.
 (a) fossils (b) history (c) tissues (d) hormones
3. *Auger* is related to *carpenter* in the same way *awl* is related to _____.
 (a) sculptor (b) cobbler (c) chef (d) mason
4. *Sirius* is related to *star* in the same way *cygnus* is related to _____.
 (a) constellation (b) asteroid (c) galaxy (d) meteor
5. *Island* is related to *archipelago* in the same way *chapter* is related to _____.
 (a) book (b) mystery (c) author (d) content
6. *Catalogue* is related to *library books* in the same way *index* is related to _____.
 (a) chapters (b) books (c) preface (d) contents
7. *Bald* is related to *blond* in the same way *barren* is related to _____.
 (a) vegetation (b) farm (c) fertile (d) inhabited
8. *Lion* is related to *prowl* in the same way *bear* is related to _____.
 (a) frisk (b) lumber (c) stride (d) bound
9. *Aflatoxin* is related to *food poisoning* in the same way *histamind* is related to _____.
 (a) allergy (b) headache (c) anthrax (d) contamination
10. *Ballworm* is related to *cotton* in the same way *ghundibug* is related to _____.
 (a) wheat (b) rice (c) millet (d) tomato
11. *Naphthalene* is related to *woollen* in the same way *antibiotics* is related to _____.
 (a) germs (b) immunity (c) diseases (d) body
12. *Drama* is related to *scene* in the same way *book* is related to _____.
 (a) story (b) page (c) chapter (d) author
13. *Tungsten* is related to *filament* in the same way *bronze* is related to _____.
 (a) copper (b) ships (c) tin (d) ornaments
14. *Tobacco* is related to *nerves* in the same way *alchohol* is related to _____.
 (a) liver (b) liquor (c) intoxication (d) head
15. *Man* is related to *shout* in the same way *crow* is related to _____.
 (a) caw (b) chirp (c) mutter (d) mob
16. *Gill* is related to *lamellae* in the same way *lung* is related to _____.
 (a) ribs (b) trachea (c) alveoli (d) pharynx
17. *Dwell* is related to *demizen* in the same way *inherit* is related to _____.
 (a) acquire (b) successor (c) outcast (d) heir

18. *Gardener* is related to *trowel* in the same way *seamstress* is related to _____.
 (a) saw (b) scissors (c) sneakers (d) crowbar
19. *Wince* is related to *pain* in the same way prostration is related to _____.
 (a) discomfiture (b) frustration (c) submissiveness (d) strained
20. *Solicitous* is related to *concern* in the same way *verbose* is related to _____.
 (a) tiredness (b) wordiness (c) speech (d) deafness
21. *Physiology* is related to *biology* in the same way metaphysics is related to _____.
 (a) Physics (b) Statistics (c) Mathematics (d) Philosophy
22. *Birds* are related to *aviary* in the same way *bees* are related to _____.
 (a) aquarium (b) hive (c) brewery (d) apiary
23. *Anthropology* is related to *man* in the same way *Anthology* is related to _____.
 (a) nature (b) trees (c) apes (d) poems
24. *Starvation* is related to *nutrition* in the same way *exhaustion* is related to _____.
 (a) energy (b) bravery (c) freshness (d) courage
25. *Snowfall* is related to *precipitation* in the same way *grotto* is related to _____.
 (a) throat (b) castle (c) cave (d) fort
26. *Condolence* is related to *loss* in the same way *congratulation* is related to _____.
 (a) praise (b) achievement (c) accusation (d) reward
27. *Lumberjack* is related to *axe* in the same way *chef* is related to _____.
 (a) bow (b) poker (c) chisel (d) colander
28. *Scrupulous* is related to *principles* in the same way ethical is related to _____.
 (a) morals (b) virtues (c) religions (d) profits
29. *Annotate* is related to *text* in the same way *caption* is related to _____.
 (a) novel (b) law (c) film (d) photograph
30. *Retirement* is related to *service* as *dismissal* is related to _____.
 (a) agreement (b) communication (c) employment (d) adoption
31. *Betel* is related to *chew* in the same way *football* is related to _____.
 (a) play (b) run (c) roll (d) kick
32. *Author* is related to *book* in the same way *choreographer* is related to _____.
 (a) drama (b) ballet (c) masque (d) opera
33. *Book* is related to *magazine* in the same way *newspaper* is related to _____.
 (a) journal (b) news (c) article (d) headline
34. *Indolence* is related to *work* in the same way *taciturn* is related to _____.
 (a) observe (b) speak (c) cheat (d) act
35. *Brain* is related to *cranium* in the same way *pearl* is related to _____.
 (a) box (b) oyster (c) sand (d) shore
36. *Wax* is related to *grease* in the same way *milk* is related to _____.
 (a) drink (b) ghee (c) curd (d) protein
37. *Hooke* is related to *cells* in the same way *mulder* is related to _____.
 (a) carbohydrates (b) minerals (c) vitamins (d) proteins
38. *Doctor* is related to *patient* in the same way *lawyer* is related to _____.
 (a) customer (b) accused (c) magistrate (d) client

39. *Chef* is related to *restaurant* in the same way *druggist* is related to _____.
 (a) medicine (b) pharmacy (c) store (d) chemist
40. *Mirror* is related to *reflection* in the same way *water* is related to _____.
 (a) conduction (b) dispersion (c) immersion (d) refraction

ANSWERS

- | | | | | | | | | | |
|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| 1. (c) | 2. (c) | 3. (b) | 4. (a) | 5. (a) | 6. (d) | 7. (c) | 8. (b) | 9. (a) | 10. (b) |
| 11. (d) | 12. (c) | 13. (d) | 14. (a) | 15. (d) | 16. (c) | 17. (d) | 18. (b) | 19. (c) | 20. (b) |
| 21. (d) | 22. (d) | 23. (d) | 24. (a) | 25. (c) | 26. (b) | 27. (d) | 28. (a) | 29. (d) | 30. (c) |
| 31. (d) | 32. (b) | 33. (a) | 34. (b) | 35. (b) | 36. (c) | 37. (d) | 38. (d) | 39. (b) | 40. (d) |

Explanations

1. The second denotes the purpose for which the first is used.
2. Ecology deals with the study of environment. Similarly, histology deals with the study of tissues.
3. The first is the tool used by the second.
4. Sirius is a star and cygnus is a constellation.
5. The first is a part of the second.
6. Catalogue is an arranged list to find the names of the library books. Similarly, index is an arranged list of contents.
7. The given words are opposite to each other.
8. The second is the manner of walking of the first.
9. The first causes the second.
10. The first damages the second.
11. The first is used to protect the second from attack by germs and insects.
12. The second is a unit of the first.
13. The first is used to make the second. Thus tungsten is used to make filament and bronze is used to make ornaments.
14. The consumption of the first affects the second.
15. The second is the noisy sound made by the first.
16. The second is the oxygen absorbing part of the first.
17. When denizen dwells, he occupies the place. When heir inherits, he occupies the throne.
18. The second is the tool used by the first.
19. The first is the sign of the second.
20. A solicitous exhibits concern and a verbose exhibits wordiness.
21. Physiology is a branch of biology. Similarly, metaphysics is a branch of philosophy.
22. Birds are reared in an aviary. Similarly, bees are kept and reared in an apiary.
23. Anthropology deals with the study of man. Similarly, anthology deals with collection of poems.
24. A lack of nutrition is starvation. Similarly, a lack of energy is exhaustion.
25. Snowfall is a type of precipitation. Similarly, grotto is a type of cave.
26. Others offer condolence in a state of loss and congratulations when one make an achievement.
27. The second is the tool used by the first.

28. When one abides by the second, he is said to be the first by nature.
29. The first is a comment on the second.
30. The first interrupts the second.
31. The first is the object and the second is the action to be performed on it.
32. The first composes the second.
33. The second contains smaller articles of the same nature as the first.
34. The given words are antonyms to each other.
35. The first is enclosed by the second.
36. The first is used to prepare the second.
37. Hooke discovered the cells. Similarly, Mulder discovered the proteins.
38. The first works for the second.
39. The second is the working place for the first.
40. Light rays falling on mirror undergo reflection and those falling on water undergo refraction.

EXERCISE 8

1. *Trigonometry* is related to *triangles* in the same way *mensuration* is related to _____.
(a) geometry (b) circles (c) areas (d) polygons
2. *Lotus* is related to *cuticle* in the same way *fish* is related to _____.
(a) scales (b) gills (c) tail (d) wings
3. *Tapeworm* is related to *taeniasis* in the same way *plasmodium* is related to _____.
(a) malaria (b) constipation (c) diphtheria (d) diarrhoea
4. *Leaf* is related to *sap* in the same way *bone* is related to _____.
(a) fluid (b) blood (c) marrow (d) calcium
5. *Chlorophyll* is related to *chloroplast* in the same way *vulture* is related to _____.
(a) flesh (b) wings (c) air (d) bird
6. *Waves* are related to *air* in the same way *ripples* are related to _____.
(a) wind (b) water (c) tree (d) bud
7. *Rung* is related to *ladder* in the same way *twig* is related to _____.
(a) leaf (b) flower (c) tree (d) bud
8. *Circle* is related to *circumference* in the same way *square* is related to _____.
(a) area (b) volume (c) diagonal (d) perimeter
9. *Grain* is related to *granary* in the same way *curios* is related to _____.
(a) archives (b) museum (c) library (d) zoo
10. *Cat* is related to *kitten* in the same way *fish* is related to _____.
(a) fry (b) fawn (c) fin (d) foal
11. *Orthopaedist* is related to *bones* in the same way *chiropodist* is related to _____.
(a) nails (b) sounds (c) feet (d) heart
12. *Formula* is related to *constituent* in the same way *equation* is related to _____.
(a) numbers (b) variables (c) term (d) constant
13. *Dog* is related to *kennel* in the same way *fowl* is related to _____.
(a) barn (b) cottage (c) nest (d) coop
14. *Honey* is related to *wax* in the same way *milk* is related to _____.
(a) cow (b) leather (c) eggs (d) butter

15. *Helm* is related to *rudder* in the same way *brain* is related to _____.
 (a) heart (b) ribs (c) limbs (d) body
16. *Crumb* is related to *bread* in the same way *morsel* is related to _____.
 (a) fruit (b) biscuit (c) food (d) cake
17. *Door* is related to *bang* in the same way *chain* is related to _____.
 (a) thunder (b) clinch (c) tinkle (d) clank
18. *Hong Kong* is related to *China* in the same way *Vatican* is related to _____.
 (a) Canada (b) Mexico (c) North America (d) Rome
19. *Horse* is related to *hay* in the same way *cow* is related to _____.
 (a) leaves (b) fodder (c) milk (d) straw
20. *Earth* is related to *axis* in the same way *wheel* is related to _____.
 (a) tyre (b) car (c) road (d) hub
21. *Gravity* is related to *pull* in the same way *magnetism* is related to _____.
 (a) repulsion (b) separation (c) attraction (d) push
22. *Symphony* is related to *composer* in the same way *fresco* is related to _____.
 (a) painter (b) inventor (c) singer (d) writer
23. *Bull* is related to *draught* in the same way as *cow* is related to _____.
 (a) livestock (b) milch (c) farm (d) fodder
24. *Tooth* is related to *grit* in the same way *fist* is related to _____.
 (a) blow (b) hand (c) open (d) clench
25. *Charminar* is related to *India* in the same way *Sphinx* is related to _____.
 (a) England (b) Canada (c) Egypt (d) Vatican
26. *Labourer* is related to *wages* in the same way *entrepreneur* is related to _____.
 (a) loan (b) interest (c) taxes (d) profit
27. *Land* is related to *cape* in the same way *water* is related to _____.
 (a) strait (b) lagoon (c) bay (d) island
28. *Umbrella* is related to *rain* in the same way *goggles* are related to _____.
 (a) light (b) glare (c) stare (d) sight
29. *Borrower* is related to *loan* in the same way *beggar* is related to _____.
 (a) alms (b) mercy (c) money (d) gift
30. *Concert* is related to *theatre* in the same way as *banquet* is related to _____.
 (a) hotel (b) party (c) feast (d) super
31. A *bird* is related to *cage* in the same way *man* is related to _____.
 (a) house (b) field (c) room (d) prison
32. The *Green Revolution* is related to *plants* in the same way the *Silver Revolution* is related to _____.
 (a) poultry (b) rubber (c) animals (d) forests
33. *Charcoal* is related to *wood* in the same way *coke* is related to _____.
 (a) plastic (b) graphite (c) soot (d) coal
34. *Joule* is related to *energy* in the same way *Pascal* is related to _____.
 (a) volume (b) pressure (c) density (d) purity
35. *Kindle* is related to *burn* in the same way *angry* is related to _____.
 (a) annoyed (b) determined (c) resentful (d) furious

36. *Ostrich* is related to *antelope* in the same way *egret* is related to _____.
 (a) cow (b) buffalo (c) camel (d) zebra
37. *Blood* is related to *circulation* in the same way *hormone* is related to _____.
 (a) egestion (b) control (c) co-ordination (d) digestion
38. *Man* is related to *arms* in the same way *cockroach* is related to _____.
 (a) wings (b) pseudopodia (c) legs (d) antennae
39. *Transistor* is related to *radio* in the same way *television* is related to _____.
 (a) entertainment (b) cinema (c) video (d) cassette
40. *cobra* is related to *snake* in the same way *leopard* is related to _____.
 (a) tiger (b) lion (c) cat (d) zebra

ANSWERS

- | | | | | | | | | | |
|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| 1. (c) | 2. (a) | 3. (a) | 4. (c) | 5. (d) | 6. (b) | 7. (c) | 8. (d) | 9. (b) | 10. (a) |
| 11. (c) | 12. (c) | 13. (d) | 14. (b) | 15. (d) | 16. (c) | 17. (d) | 18. (d) | 19. (b) | 20. (d) |
| 21. (c) | 22. (a) | 23. (b) | 24. (d) | 25. (c) | 26. (d) | 27. (c) | 28. (b) | 29. (b) | 30. (a) |
| 31. (d) | 32. (c) | 33. (d) | 34. (b) | 35. (d) | 36. (b) | 37. (c) | 38. (d) | 39. (b) | 40. (c) |

Explanations

1. Trigonometry is the study of triangles. Similarly, mensuration is the study of areas.
2. The second is the means to protect the body of the first from water.
3. The second is the disease caused by the first.
4. The second is the fluid contained in the first.
5. Chlorophyll is a type of chloroplast. Similarly, vulture is a type of bird.
6. Waves travel in air; ripples travel in water.
7. The first is a part of the second.
8. The second is the measure of boundary of the first.
9. Grain is stored in a granary. Similarly, curios (rare things to be collected) are kept in a museum.
10. The second is the young one of the first.
11. The first is a specialist of the second.
12. The second is a unit of the first.
13. The second is the living place of the first.
14. Honey and wax are both obtained from the same organism i.e. bee. Similarly, milk and leather both are obtained from buffalo.
15. Helm regulates the rudder and brain regulates the body.
16. The first is a part of the second.
17. The second is the sound made by the first.
18. Hong Kong is a city of China. Similarly, Vatican is a city of Rome.
19. The second is the food for the first.
20. The first rotates about the second.
21. The first draws things nearer through the second.
22. The first is prepared by the second.
23. The bull is a draught animal (beast of burden) and the cow is a milch animal (milk yielding).

24. The hold of tooth is called grit and the hold of the fist is called clench.
25. Charminar is situated in India. Similarly, Sphinx is a monument of Egypt.
26. The first earns in the form of the second.
27. The cape is the land projected into the water and the bay is the portion of water body projected into land.
28. The first provides protection from the second.
29. The first gets money in the form of the second.
30. The second is the place where the first is held.
31. The first is locked up in the second.
32. The first is the name given to increase in the production of the second.
33. The first is obtained from the second.
34. Joule is the unit of energy and Pascal is the unit of pressure.
35. The second is the larger intensity of the first.
36. Both live together to derive benefits from each other.
37. The second is the function of the first.
38. The first uses the second for the purpose of holding.
39. The second is the enlarged form of the first.
40. The first belongs to the family of the second.

EXERCISE 9

Directions: In each of the following questions, the first two words (given in italics) have a definite relationship. Choose one word out of the given four alternatives which will fill in the blank space and show the same relationship with the third word as between the first two.

1. *Hygrometer* is to *humidity* as *sphygmomanometer* is to _____.
 (a) pressure (b) blood pressure (c) precipitation (d) heart beat
2. *Steel* is to *Bokaro* as *hosier* is to _____.
 (a) Chennai (b) Patna (c) Vishakhapatnam (d) Ludhiana
3. *Milk* is to *water* as *ghee* is to _____.
 (a) vanaspati (b) mustard oil (c) argemome (d) cream
4. *Insulin* is to *hormone* as *trypsin* is to _____.
 (a) juice (b) liver (c) enzyme (d) digestion
5. *Ploughing* is to *aeration* as *manuring* is to _____.
 (a) fertile (b) replenishment (c) earthing (d) agriculture
6. *Infestation* is to *food* as *infection* is to _____.
 (a) germs (b) diseases (c) body (d) microbes
7. *Book* is to *publisher* as *film* is to _____.
 (a) writer (b) editor (c) director (d) producer
8. *Bicycle* is to *pedal* as *boat* is to _____.
 (a) steering (b) water (c) oar (d) sail
9. *Latex* is to *rubber* as *flax* is to _____.
 (a) linen (b) wool (c) jute (d) cotton
10. *Cattle* is to *fodder* as *fish* is to _____.
 (a) hay (b) insects (c) feed (d) plankton

11. *Algae* is to *water* as *virus* is to _____.
 (a) man (b) host (c) surroundings (d) soil
12. *Insomnia* is to *lead* as *minamata* is to _____.
 (a) tobacco (b) mercury (c) alcohol (d) chromium
13. *Orange* is to *peel* as *tooth* is to _____.
 (a) gums (b) clove (c) enamel (d) joints
14. *Hear* is to *deaf* as *speak* is to _____.
 (a) quiet (b) silent (c) numb (d) dumb
15. *Exercise* is to *obesity* as *water* is to _____.
 (a) thirst (b) alcohol (c) drink (d) purity
16. *Food* is to *fad* as *religion* is to _____.
 (a) crucification (b) notion (c) superstition (d) mythology
17. *Sulphur* is to *vulcanisation* as *chlorine* is to _____.
 (a) extraction (b) bleaching (c) metallurgy (d) allotropy
18. *Magnalium* is to *aluminium* as *brass* is to _____.
 (a) lead (b) magnetism (c) iron (d) copper
19. *Infrared* is to *heat* as *ultraviolet* is to _____.
 (a) cancer (b) blisters (c) mutation (d) ozone
20. *Zinc* is to *galvanisation* as *nickel* is to _____.
 (a) aircraft (b) corrosion (c) electroplating (d) filament
21. *Memory* is to *amnesia* as *movement* is to _____.
 (a) lubrication (b) lethargy (c) paralysis (d) hermit
22. *Liquid* is to *fluidity* as *comedian* is to _____.
 (a) ridicule (b) humour (c) solemnity (d) companion
23. *Kilometre* is to *distance* as *poundal* is to _____.
 (a) density (b) acceleration (c) momentum (d) force
24. *Truthfulness* is to *liar* as *loyalty* is to _____.
 (a) worker (b) traitor (c) diligent (d) faithful
25. *Preface* is to *book* as *overture* is to _____.
 (a) opera (b) ballad (c) novel (d) symphony
26. *Aluminium* is to *bauxite* as *iron* is to _____.
 (a) pyrite (b) magnesite (c) pyrolusite (d) haematite
27. *Tempest* is to *storm* as *slim* is to _____.
 (a) fat (b) plump (c) slender (d) beautiful
28. *Amorphousness* is to *definition* as *lassitude* is to _____.
 (a) energy (b) awareness (c) uniformity (d) companionship
29. *Tiff* is to *battle* as *frugal* is to _____.
 (a) sprint (b) vague (c) miserly (d) vital
30. *Exculpate* is to *acquit* as *precise* is to _____.
 (a) concise (b) conceal (c) brief (d) particular
31. *Burma* is to *Pagodas* as *Pakistan* is to _____.
 (a) Rivers (b) Canals (c) Agriculture (d) Dams
32. *Bhakra* is to *Sutlej* as *Aswan* is to _____.
 (a) Indus (b) Damodar (c) Volga (d) Nile

33. Sparrow is to seed as silkworm is to _____.
(a) silk (b) maple (c) mulberry (d) pune

34. Pineapple is to jelly as tomato is to _____.
(a) jam (b) pury (c) squash (d) pickles

35. Aseel is to poultry as salmon is to _____.
(a) cow (b) camel (c) fish (d) horse

ANSWERS

1. (b) 2. (d) 3. (a) 4. (c) 5. (b) 6. (c) 7. (d) 8. (c) 9. (a) 10. (d)
11. (b) 12. (b) 13. (c) 14. (d) 15. (a) 16. (c) 17. (b) 18. (d) 19. (a) 20. (c)
21. (c) 22. (b) 23. (d) 24. (b) 25. (a) 26. (d) 27. (c) 28. (a) 29. (c) 30. (d)
31. (b) 32. (d) 33. (c) 34. (b) 35. (c)

Explanations

1. The first is an instrument used to measure the second.
 2. Bokaro is famous for steel industry and Ludhiana is famous for hosiery works.
 3. The first is adulterated by using the second.
 4. The second denotes the class to which the first belongs. Thus, insulin is a hormone and *trypsin* is an enzyme.
 5. Ploughing is done for the aeration of soil and manuring is done for the replenishment of soil.
 6. The contamination of food by germs is called infestation. Similarly, attack on body by germs is called infection.
 7. The production of the first is done by the second.
 8. The second is the tool which is acted upon to move the first.
 9. The first is the raw material used to obtain the second.
 10. The second is the food eaten by the first.
 11. The second is the dwelling place for the first.
 12. The poisoning by the second causes the first.
 13. The second is the protective covering over the first.
 14. One who cannot hear is deaf. Similarly, one who cannot speak is dumb.
 15. The first eliminates the second.
 16. The second is the name given to wrong notions about the first.
 17. Sulphur is used for vulcanisation of rubber. Likewise, chlorine is used for bleaching.
 18. Magnalium is an ore of aluminium and brass is an ore of copper.
 19. The second is the effect produced by the first.
 20. The second is the purpose for which first is used.
 21. The lack of memory is amnesia and lack of movement is paralysis.
 22. The second is the defining characteristic of the first.
 23. Kilometre is a unit of distance and poundal is a unit of force.
 24. The lack of first is the defining characteristic of the second.
 25. The first is an opening comment on the second.
 26. The second is the ore used for extraction of the first.

27. The first is of the higher intensity than the second.
28. The given words are opposite to each other.
29. The second is of higher intensity than the first.
30. The given words are synonyms of each other.
31. Burma is famous for pagodas and Pakistan is famous for canals.
32. Bhakra is a dam situated on the Sutlej river. Similarly, Aswan is a dam situated on Nile river.
33. The first feeds on the second.
34. The first is preserved in the form of the second.
35. Aseel is a breed of poultry and salmon is a breed of fish.

Classification

Classification means ‘to assort the items of a given group on the basis of a certain common quality they possess and then spot the stranger out’.

In this test, a group of five items will be given, out of which four are similar to one another in the same manner and one is different. You have to find out this item which does not fit into the group.

Directions: Choose the word which is least like the other words in the group.

EXAMPLE 1 (a) Copper (b) Tin (c) Brass (d) Platinum (e) Zinc

Solution Here, all except brass are metal while brass is an alloy. Hence the answer is (c).

EXAMPLE 2 (a) Calf (b) Cub (c) Piglet (d) Duckling (e) Hireling

Solution Here, all except Hireling, are young ones of animals. Hence the answer is (e).

EXAMPLE 3 (a) Curd (b) Butter (c) Oil (d) Cheese (e) Cream

Solution Here, all except, oil are products obtained from milk. Hence the answer is (c).

EXAMPLE 4 (a) Magnalium (b) Germanium (c) Duralumin
(d) Bronze (e) Brass

Solution All, except germanium, are alloys, while germanium is a metal. So, the answer is (b).

EXAMPLE 5 (a) Garnet (b) Ruby (c) Graphite (d) Emerald (e) Topaz

Solution All, except graphite, are precious stones. So the answer is (c).

EXERCISES

Directions: In each of the following questions, five words are given, out of which four are alike in some manner and one is different. Choose the odd one out.

1. (a) Nephrology (b) Entomology (c) Astrology (d) Mycology (e) Pathology

2. (a) Whale (b) Dolphin (c) Shark (d) Cod (e) Starfish

3. (a) Indigo (b) Orange (c) Yellow (d) Pink (e) Green

| | | | | |
|-------------------|-------------------|-----------------|------------------|-------------------|
| 4. (a) Tarapur | (b) Kota | (c) Kalpakkam | (d) Paradeep | (e) Narora |
| 5. (a) Brick | (b) Heart | (c) Diamond | (d) Spade | (e) Club |
| 6. (a) Cataract | (b) Hypermetropia | (c) Trachoma | (d) Eczema | (e) Glaucoma |
| 7. (a) Radium | (b) Thorium | (c) Sodium | (d) Polonium | (e) Uranium |
| 8. (a) Bishop | (b) Knight | (c) Pawn | (d) Rook | (e) Jockey |
| 9. (a) Mongolia | (b) China | (c) Burma | (d) Afghanistan | (e) Bangladesh |
| 10. (a) Wise | (b) Gentle | (c) Honest | (d) Rude | (e) Arrogance |
| 11. (a) Pituitary | (b) Pancreas | (c) Thalamus | (d) Adrenal | (e) Testis |
| 12. (a) Nun | (b) Knight | (c) Monk | (d) Priest | (e) Padre |
| 13. (a) Granite | (b) Lignite | (c) Peat | (d) Anthracite | (e) Bituminous |
| 14. (a) Gasoline | (b) Methane | (c) Asphalt | (d) Paraffin wax | (e) Diesel |
| 15. (a) Galileo | (b) Coppernicus | (c) Columbus | (d) Bhaskara | (e) Aryabhatta |
| 16. (a) Cricket | (b) Baseball | (c) Football | (d) Billiards | (e) Badminton |
| 17. (a) Rigveda | (b) Yajurveda | (c) Atharvaveda | (d) Ayurveda | (e) Samaveda |
| 18. (a) Producer | (b) Director | (c) Investor | (d) Financier | (e) Entrepreneur |
| 19. (a) Flute | (b) Guitar | (c) Sitar | (d) Violin | (e) Veena |
| 20. (a) Kiwi | (b) Eagle | (c) Emu | (d) Penguin | (e) Ostrich |
| 21. (a) Tortoise | (b) Snail | (c) Turtle | (d) Spider | (e) Oyster |
| 22. (a) Epicentre | (b) Seismology | (c) Focus | (d) Crater | (e) Richter Scale |
| 23. (a) Arrow | (b) Missile | (c) Sword | (d) Bullet | (e) Spear |
| 24. (a) Nerves | (b) Auricle | (c) Artery | (d) Valve | (e) Aorta |
| 25. (a) Konark | (b) Madurai | (c) Ellora | (d) Khajuraho | (e) Dilwara |
| 26. (a) Akbar | (b) Jahangir | (c) Shah Jahan | (d) Vikramaditya | (e) Aurangazeb |
| 27. (a) Manipur | (b) Sikkim | (c) Maharashtra | (d) Haryana | (e) Lakshadweep |
| 28. (a) Sial | (b) Mantle | (c) Core | (d) Sima | (e) Pengia |
| 29. (a) Turtle | (b) Lamb | (c) Colt | (d) Bitch | (e) Farrow |
| 30. (a) Mettur | (b) Aswan | (c) Hirakund | (d) Sutlej | (e) Pong |

ANSWERS

- | | | | | | | | | | |
|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| 1. (c) | 2. (a) | 3. (d) | 4. (d) | 5. (a) | 6. (d) | 7. (c) | 8. (e) | 9. (a) | 10. (e) |
| 11. (c) | 12. (b) | 13. (a) | 14. (b) | 15. (c) | 16. (d) | 17. (d) | 18. (b) | 19. (a) | 20. (b) |
| 21. (d) | 22. (d) | 23. (c) | 24. (a) | 25. (c) | 26. (d) | 27. (e) | 28. (e) | 29. (d) | 30. (d) |

Explanations

- All except astrology are concerned with biology.
- All except whale belong to the family of fishes, while whale is a mammal.
- All except pink are colours seen in a rainbow.
- All except Paradeep are atomic power stations, whereas Paradeep is a port.
- All except brick are suits of cards.
- All except eczema are eye infections, whereas eczema is a skin infection.
- All except sodium are radio isotopes, whereas sodium is a metal.
- All except jockey are chessmen, whereas jockey is a professional horse rider.

9. All except Mongolia are neighbouring countries of India.
10. All except arrogance are adjectives, whereas arrogance is a noun.
11. All except thalamus are hormone secreting glands.
12. All except knight are religious persons, whereas knight is a warrior.
13. All except granite are different types of coal, whereas granite is a rock.
14. All except methane are products obtained from petroleum.
15. All except Columbus were astronomers, whereas Columbus was an explorer.
16. All except billiards are outdoor games.
17. All except Ayurveda are names of holy scriptures, the four vedas, Ayurveda is a branch of medicine.
18. All except director spend money.
19. All except flute are string instruments.
20. All except eagle are flightless birds.
21. All except spider have hard protective shells.
22. All except crater are terms associated with the earthquake.
23. All except sword strike the target at a distance.
24. All except nerves are parts of the heart.
25. All except Ellora are famous for temples whereas Ellora is famous for caves.
26. All except Vikramaditya were Mughal rulers.
27. All except Lakshadweep are states of India, whereas Lakshadweep is a Union Territory.
28. All except pengia are layers of earth.
29. All except bitch are young ones of animals, whereas bitch is a female dog.
30. All except Sutlej are dams, whereas Sutlej is a river.

Series Completion

This chapter deals with the questions in which a series of numbers or alphabetical letters is given, which are called *terms of the series*. These terms follow a certain pattern. You have to recognize this pattern and either complete the given series with the most suitable alternative or find the wrong term in the series.

TYPE 1: NUMBER SERIES

Case I: Completing the Given Series

EXAMPLE 1 Tick the number that will come next in the following sequence:

Solution The given sequence is a combination of two series $4, 12, 28, \dots$ and $6, 14, 30$. The number pattern followed in the first series is $+8, +16, +32, \dots$

So, the missing number = $28 + 32 = 60$.

Hence, the answer is (d).

EXAMPLE 2 Complete the series: 4, -8, 16, -32, 64, (...)

Solution Each number in the series is got by multiplying the preceding number by -2 .

$$\therefore \text{Missing term} = 64 \times (-2) = -128$$

Hence, the answer is (b).

EXAMPLE 3 Which number would replace the question mark in the series 2, 7, 14, 23, ?, 47.

Solution The given sequence is $+5, +7, +9, \dots$ i.e. $2 + 5 = 7; 7 + 7 = 14; 14 + 9 = 23$.

$$\therefore \text{Missing number} = 23 + 11 = 34.$$

Hence, the answer is (b).

EXERCISE 1

Directions: In each of the following questions, a number series is given with one term missing. Choose the correct alternative that will continue the same pattern and fill in the blank spaces.

- | [CBI Exam] | | | |
|--|--------------------|--|--|
| 1. 2, 6, 11, 17, (...), 32 (a) 22 (b) 23 (c) 24 (d) 28 | | | |
| 2. 3, 10, 20, 33, 49, 68, (...) (a) 75 (b) 85 (c) 90 (d) 91 | [Hotel Management] | | |
| 3. 3, 7, 15, 31, 63, (...) (a) 92 (b) 127 (c) 115 (d) 131 | [Railways] | | |
| 4. 6, 24, 12, (...), 18, 8, 24 (a) 4 (b) 8 (c) 16 (d) 6 | [Railways] | | |
| 5. 212, 179, 146, 113, (...) (a) 91 (b) 79 (c) 112 (d) 80 | [Railways] | | |
| 6. 2, 6, 3, 4, 20, 5, 6, (...), 7 (a) 25 (b) 30 (c) 42 (d) 28 | [Railways] | | |
| 7. 2, 5, 9, 19, 37, (...) (a) 76 (b) 75 (c) 74 (d) 72 | [Railways] | | |
| 8. 2, 6, 12, 20, 30, 42, 56, (...) (a) 60 (b) 64 (c) 70 (d) 72 | [Railways] | | |
| 9. 8, 24, 12, 36, 18, 54, (...) (a) 27 (b) 68 (c) 72 (d) 108 | | | |
| 10. 165, 195, 255, 285, 345, (...) (a) 375 (b) 420 (c) 435 (d) 390 | | | |
| 11. 71, 76, 69, 74, 67, 72, (...) (a) 65 (b) 76 (c) 77 (d) 80 | | | |
| 12. 9, 12, 11, 14, 13, (...), 15 (a) 12 (b) 16 (c) 10 (d) 17 | | | |
| 13. 3, 15, 35, (...), 99, 143 (a) 48 (b) 63 (c) 80 (d) 95 | | | |
| 14. 3, 10, 20, 33, 49, 68, (...) (a) 75 (b) 85 (c) 90 (d) 91 | | | |
| 15. 1, 3, 4, 8, 15, 27, (...) (a) 37 (b) 44 (c) 50 (d) 55 | | | |
| 16. 66, 36, 18, (...) (a) 9 (b) 3 (c) 6 (d) 8 | | | |
| 17. 11, 13, 17, 19, 23, 25, (...) (a) 25 (b) 27 (c) 29 (d) 31 | | | |
| 18. 2, 4, 7, 11, 16, (...) (a) 18 (b) 20 (c) 22 (d) 25 | | | |
| 19. 0, 2, 6, (...), 20, 30, 42 (a) 8 (b) 10 (c) 12 (d) 14 | | | |

ANSWERS

- 1.** (c) **2.** (c) **3.** (b) **4.** (c) **5.** (d) **6.** (c) **7.** (b) **8.** (d) **9.** (a) **10.** (c)
11. (a) **12.** (b) **13.** (b) **14.** (c) **15.** (c) **16.** (d) **17.** (c) **18.** (c) **19.** (c) **20.** (a)
21. (c) **22.** (a) **23.** (b) **24.** (d) **25.** (a) **26.** (c) **27.** (b) **28.** (d) **29.** (d) **30.** (b)

Explanations

- The sequence is +4, +5, +6 ...
 \therefore Missing term = $17 + 7 = 24$.
 - The sequence is +7, +10, +13, +16, +19 ...
 \therefore Missing number = $68 + 22 = 90$
 - Each number in the series is the preceding number multiplied by 2 and then increased by 1.
Thus $(3 \times 2) + 1 = 7$; $(7 \times 2) + 1 = 15$; $(15 \times 2) + 1 = 31$ and so on.
 - The given sequence is a combination of two series 6, 12, 18, 24, and 24, (...), 8.
The first series consists of consecutive multiples of 6 and the second series consists of multiples of 8. Thus, the missing number is a multiple of 8 which lies between 8 and 24, which is 16.
 - 33 is subtracted from each term of the series to obtain the next term.
 \therefore Missing term = $113 - 33 = 80$
 - The arrangement of series is as follows: $2 \times 3 = 6$; $4 \times 5 = 20$, and so on.
Here from each three consecutive term, middle term = product of two end terms. So the missing number = $6 \times 7 = 42$.

7. Here, the numbers in the even position are equal to the numbers in the odd position multiplied by 2 and added by 1. The numbers in the odd positions are got by multiplying numbers in the even position by 2 and subtracting 1 from it. So the answer is $37 \times 2 + 1 = 75$.
8. The sequence is $1 \times 2, 2 \times 3, 3 \times 4, 4 \times 5, 5 \times 6, 6 \times 7, 7 \times 8$.
 \therefore Next number = $8 \times 9 = 72$.
9. This series is got by alternatively multiplying by 3 and dividing by 2.
So, $8 \times 3 = 24; 24 \div 2 = 12, 12 \times 3 = 36; 36 \div 2 = 18$ and so on.
 \therefore The missing term = $54 \div 2 = 27$.
10. This series is a multiple of consecutive prime numbers.
i.e. $15 \times 11, 15 \times 13, 15 \times 17, 15 \times 19, 15 \times 23$.
 \therefore The missing term = $15 \times 29 = 435$.
11. Here the series is got by addition of 5 and subtraction of 7 to terms alternately.
Here, $71 + 5 = 76; 76 - 7 = 69; 69 + 5 = 74; 74 - 7 = 67$ and so on.
So the missing term = $72 - 7 = 65$.
12. Alternately, add 3 and subtract = 1.
So $9 + 3 = 12; 12 - 1 = 11; 11 + 3 = 14; 14 - 1 = 13$.
So the missing term = $13 + 3 = 16$.
13. The terms of the series are $2^2 - 1, 4^2 - 1, 6^2 - 1, \dots, 10^2 - 1, 12^2 - 1$.
So, the missing number = $8^2 - 1 = 64 - 1 = 63$.
14. The sequence is $+7 + 10, +13, +16, +19, \dots$
So, the missing number = $68 + 22 = 90$.
15. The sum of any three consecutive terms of the series gives the next term.
So, $1 + 3 + 4 = 8; 3 + 4 + 8 = 15; 4 + 8 + 15 = 27$ and so on.
 \therefore The missing number = $8 + 15 + 27 = 50$.
16. Each number in the series is the product of the digits of the preceding number.
i.e. $6 \times 6 = 36; 3 \times 6 = 18$ and so on.
 \therefore The missing number = $1 \times 8 = 8$
17. The sequence is $+2, +4, +2, +4, +2, \dots$
 \therefore The missing number = $25 + 4 = 29$
18. The difference between consecutive numbers increases by 1.
Thus, the sequence is $+2, +3, +4, +5 \dots$
 \therefore The missing number = $16 + 6 = 22$.
19. The sequence is $+2, +4, \dots, \dots, +10, +12$
So, the missing number = $6 + 6 = 12$.
20. The numbers are alternately multiplied by 2 and increased by 3.
So, $5 \times 2 = 10; 10 + 3 = 13; 13 \times 2 = 26; 26 + 3 = 29$ and so on.
 \therefore The missing number = $61 \times 2 = 122$.
21. The sequence is $1^3 + 1, 2^3 + 1, 3^3 + 1, 4^3 + 1, 5^3 + 1, \dots$
 \therefore The missing number = $6^3 + 1 = 216 + 1 = 217$.
22. The sum of two consecutive numbers of the series gives the next number.
Thus, $4 + 9 = 13; 9 + 13 = 22; 13 + 22 = 35$ and so on.
 \therefore The missing number = $22 + 35 = 57$.
23. The numbers are $1^3, 2^3, 3^3, 4^3, 5^3, 6^3$ and so on.
 \therefore The missing number = $7^3 = 343$.

24. The numbers are alternately multiplied by 2 and 3/2.

Thus, $1 \times 2 = 2$; $2 \times \frac{3}{2} = 3$; $3 \times 2 = 6$; $6 \times \frac{3}{2} = 9$; and so on.

$$\therefore \text{The missing number} = 18 \times \frac{3}{2} = 27.$$

25. The series consists of prime numbers.

\therefore The missing number is the next prime number, which is 43.

26. The sequence is +3, +6, +12, +24 ...

$$\therefore \text{the missing number} = 47 + 48 = 95.$$

27. The given sequence is a combination of two series 4, 5, 7, 8, 10 and 9, 12, 15, (...)

$$\therefore \text{The missing term} = 15 + 3 = 18.$$

28. The given sequence consists of two series: 10, 13, 16, 19 and 5, 10, 20, (...)

$$\therefore \text{The missing number} = 20 \times 2 = 40.$$

29. The sequence is 1×2 , 2×3 , 3×4 , 4×5 , 5×6 , 6×7 , 7×8 .

$$\therefore \text{The missing term} = 8 \times 9 = 72.$$

30. The given series consists of prime numbers starting from 2. The prime number after 11 is 13. So, 13 is the missing number.

Case II: Finding the Wrong Term in the Given Series

EXAMPLE 4 Find the wrong number in the series.

$$3, 8, 15, 24, 34, 48, 63$$

- (a) 15 (b) 24 (c) 34 (d) 48 (e) 63

Solution The difference between consecutive terms of the given series are respectively 5, 7, 9, 11 and 13.

So 34 is the wrong number.

Answer is (c).

EXAMPLE 5 Find the wrong number in the series.

$$10, 26, 74, 218, 654, 1946, 5834$$

- (a) 26 (b) 74 (c) 218 (d) 654 (e) 1946

Solution Each term is obtained by multiplying the preceding term by 3 and then subtracting 4 from it.

So, $26 = (10 \times 3) - 4$; $74 = (26 \times 3) - 4$; $218 = (74 \times 3) - 4$ and so on.

So the wrong number is 654.

Answer is (d).

EXERCISE 2

Directions: In each of the following questions, one term in the number series is wrong. Find out the wrong term.

1. 8, 14, 26, 48, 98, 194, 386

- (a) 194 (b) 98 (c) 14 (d) 48 (e) 386

2. 8, 13, 21, 32, 47, 63, 83

- (a) 21 (b) 13 (c) 32 (d) 83 (e) 47

[Bank PO]

ANSWERS

- 1.** (d) **2.** (e) **3.** (a) **4.** (c) **5.** (d) **6.** (e) **7.** (c) **8.** (c) **9.** (d) **10.** (e)
11. (e) **12.** (a) **13.** (e) **14.** (d) **15.** (d)

Explanations

1. Each term in the series is less than twice the preceding term by 2.
So, 48 is wrong, correct term = $(26)2 - 2 = 52 - 2 = 50$.
 2. The sequence is +5, +8, +11, +14, and so on. Here 47 is wrong. Correct term = $32 + 14 = 46$.
 3. Each number in the series is multiplied by 2 and the result increased by 1 to obtain the next number.
 \therefore 39 is wrong. The correct term = $(15 \times 2) + 1 = 31$.
 4. Each number is obtained by dividing the preceding number by 2 after subtracting 3 from it.

i.e. $221 = \left(\frac{445 - 3}{2}\right)$; $109 = \left(\frac{221 - 3}{2}\right)$ and so on.

∴ 46 is wrong. The correct term is $\left(\frac{109 - 3}{2}\right) = 53$.

5. The sequence is $+1^2, +2^2, +3^2 +4^2, +5^2, +6^2$
 $\therefore 91$ is wrong. The correct number is $56 + 6^2 = 56 + 36 = \mathbf{92}$.
6. The numbers are $1^2 + 1, 2^2 + 1, 3^2 + 1$ and so on.
 $\therefore 64$ is wrong. The correct term is $8^2 + 1 = \mathbf{65}$.
7. The terms are successively divided by 12, 10, 8, 6 etc. So, 24 is wrong. Correct term $= 48/6 = \mathbf{8}$.
8. The sequence is $-1, -3, -5, -7, -9, -11$, etc.
So, 34 is wrong. Correct term $= 43 - 7 = \mathbf{36}$.
9. The sequence is $-66, -55, -44, -33, -22, -11$.
So, 202 is wrong. Correct term $= 259 - 55 = \mathbf{204}$.
10. Sequence is $+1, -2, +3, -4, +5$.
So, 129 is wrong.
Correct term $= 123 + 5 = \mathbf{128}$.
11. Sequence is obtained by adding 1 to preceding term and then multiplying successively by 1, 2, 3, and so on.
So, 32 is wrong. Correct term $= (10 + 1)3 = \mathbf{33}$.
12. The correct sequence is a set of squares of consecutive odd numbers.
i.e. $5^2, 7^2, 9^2, 11^2, 13^2, 15^2$.
So, 36 is wrong in the series.
13. The sequence is $+16, +18, +20, +22, +24$.
So, 150 is wrong. Correct term $= 132 + 24 = \mathbf{156}$.
14. This is an alternate series.
i.e. $+7, +5, +7, +5$ and so on.
So, 40 is wrong. Correct term $= 37 + 5 = \mathbf{42}$.
15. Sequence is as follows:
2nd term $=$ 1st term $+ 4 = 10 + 4 = 14$;
3rd term $=$ 2nd term $\times 2 = 14 \times 2 = 28$;
4th term $=$ 3rd term $+ 4 = 28 + 4 = 32$;
5th term $=$ 4th term $\times 2 = 32 \times 2 = 64$ and so on.
So, 132 is wrong. Correct term $= 68 \times 2 = \mathbf{136}$.

TYPE 2: ALPHABET SERIES

EXAMPLE 6 What will be the next term in

BKS, DJT, FIU, HHV, (...)

- (a) IJX (b) IGX (c) JGW (d) IGU (e) JGU

Solution In each term, the first letter is moved forward by 2 letters the second letter backward by 1 letter and the third letter moved forward by 1 letter. So the missing term is JGW. So the answer is (c).

EXAMPLE 7 Choose the alternative that will complete the series:

aku, fpz, kue, (...), ueo, zjt

- (a) pzj (b) jtd (c) jue (d) kve (e) ukv

Solution The letters in each term in all the positions are moved forward by 5. So the missing term = pzj. So the answer is (a).

EXAMPLE 8 What terms will fill in the blank spaces?

Y W U S Q (...) (...)

- (a) N, J (b) M, L (c) J, R (d) L, M (e) O, M

Solution The given series consists of alphabet in the reverse order moved by 2 in each step. So the missing terms are O and M.

The answer is (e).

EXERCISE 3

Directions: In each of the following questions, various terms of a letter series are given with one term missing as shown by (?). Choose the missing term out of the given alternative.

- | | |
|--|------------|
| 1. AZ, BY, CX, ? | [Bank PO] |
| (a) EF (b) GH (c) IJ (d) DE (e) DW | |
| 2. DEF HIJ MNO ? | |
| (a) STU (b) RST (c) RTV (d) SRQ (e) TUV | [Bank PO] |
| 3. BXJ ETL HPN KLP ? | |
| (a) NHR (b) MHQ (c) MIP (d) NIR (e) None of these | [SBI PO] |
| 4. AB DEF HIJK ? STUVWX | |
| (a) MNOPQ (b) LMNOP (c) LMNO (d) QRSTU (e) None of these | [Bank PO] |
| 5. A Z X B V T C R (?), (?) | |
| (a) P, D (b) E, O (c) Q, E (d) O, Q (e) Q, O | [RRB] |
| 6. G, H, J, M, (?), V | |
| (a) T (b) S (c) R (d) U (e) Q | [Bank PO] |
| 7. P3C, R5F, T8I, V12L, ? | |
| (a) Y17O (b) X17M (c) X17O (d) X16O (e) None of these | [SBI PO] |
| 8. AYD BVF DRH ? KGL | |
| (a) FMI (b) GMJ (c) HLK (d) GLJ (e) None of these | [AAO Exam] |
| 9. CX FU IR ? OL RI | |
| (a) LO (b) MN (c) NO (d) OP (e) OR | |
| 10. DEB IJG NOL ? XYV | |
| (a) RSP (b) STP (c) RSQ (d) STQ (e) STO | |
| 11. A CD GHI ? UVWXY | |
| (a) LMNO (b) MNO (c) NOPQ (d) NOP (e) MNOP | |
| 12. EJOT DHLP CFIL ? | |
| (a) BDFH (b) BHLH (c) DEIJ (d) DGKL (e) HFDB | |
| 13. OTE PUF QVG RWH ? | |
| (a) SYJ (b) TXI (c) SXJ (d) SXI (e) TYJ | |
| 14. DCXW FEVU HGTS ? | |
| (a) LKPO (b) ABYZ (c) JIRQ (d) LMRS (e) JRIQ | |
| 15. R, M, (?), F, D, (?) | |
| (a) C, B (b) J, H (c) B, H (d) H, C (e) I, C | |
| 16. C, B, A, E, D, Z, G, F, (?) | |
| (a) X (b) Y (c) V (d) H (e) J | |

17. CMW, HRB, (?), RBL, WGQ, BLV
 (a) MWG (b) LVF (c) LWG (d) MXG (e) WMX
18. HS, JQ, LO, NM, (?)
 (a) PK (b) RH (c) PL (d) TG (e) RT
19. QPO, SRQ, UTS, WVU, (?)
 (a) XVZ (b) ZYA (c) YXW (d) VWX (e) AZY
20. ABP, CDQ, EFR, (?)
 (a) GHS (b) GHT (c) HGS (d) GHR (e) GSH

ANSWERS

1. (e) 2. (a) 3. (a) 4. (a) 5. (a) 6. (e) 7. (c) 8. (b) 9. (a) 10. (d)
 11. (e) 12. (a) 13. (d) 14. (c) 15. (e) 16. (b) 17. (a) 18. (a) 19. (c) 20. (a)

Explanations

- In each term, the first letter is moved 1 step forward and the second letter is moved 1 step backward to obtain the corresponding letters of the successive terms.
- The letters in each term are consecutive. There is a gap of one letter between the last letter of the first term and the first letter of the second term. In the successive terms the gap increases by one. So the last term is STU, which is having a gap of 3 letters from the last letter of the previous term.
- The first, second and third letters of each term are moved three steps forward, four steps backward and two steps forward respectively to obtain the corresponding letters of the successive terms.
- The number of letters in the terms increases by one at every step. Each term consists of letters in the alphabetical order. There is a gap of one letter between the last letter of a term and first letter of next term.
- The first, fourth and seventh letters are in alphabetical order. So the tenth letter would be the letter after C. i.e., D.
 The second and third are alternate and in the reverse order and so are the fifth and sixth and eighth and ninth. So 9th letter = R - 2 = P.
 So the answer is (a) P, D.
- The first, second, third, fourth and fifth terms are moved one, two, three, four and five steps respectively forward to obtain the successive terms so, M + 4 = Q.
- The first letters of the terms are alternate. The last letters of the terms are three steps ahead of last letter of the preceding term. The middle letter of the term follows the pattern +2, +3, +4, +5. So the next term = X170.
- The first letters of the term are moved one, two, three and four steps forward respectively to obtain the first letter of the successive terms. The second letters of the term are moved three, four, five, and six steps backward respectively to obtain the second letters of the successive terms. The last letters of the terms are alternate.
- The first letter of each term is moved three steps forward and the second letter is moved three steps backward to obtain the corresponding letters of the next term.
- The letters in each term are moved five steps forward to obtain the letters of the next term.
- The first term consists of one letter, the second term consists of two letters and the third letter consists of three letters. So, the required term consists of four letters. The last letter of first term and the first letter of the second term differ by two letters. Similarly, a gap of two

letters is there between the last letter of second term and the first letter of the third term. So the first letter of required term would be four steps ahead from the last letter of third term.

12. The letters of each term are moved one step backward to obtain the corresponding letters of the next term.
 13. The first letters of the terms are in alphabetical order, and so are the second and third letters.
 14. The first two letters of the term are in the reverse order. Similarly, the third and fourth letters of the term are also in the reverse order. Besides, the second letter of each term is the letter next to the first letter of the preceding term.
 15. The letters are in the reverse order in which letters are moved 1, 2, 3, 4 and 5 steps from the last.
 16. The third, sixth and ninth letters of the series are in reverse alphabetical order.
 17. All the letters of each term are moved five steps forward to obtain the corresponding letters of the next term.
 18. The first letter of each term is moved two steps forward and the second letter is moved two steps backward to obtain the corresponding letters of the next term.
 19. Each term in the series consists of three consecutive letters in the reverse order. The first letter of each term and the last letter of the next term are the same.
 20. The first and second letters of each term are moved two steps forward to obtain the corresponding letters of the next term. The third letter of the terms are consecutive terms in the alphabet.

TYPE 3: LETTER SERIES

This type of question usually consists of small letters which follow a certain pattern. Some letters are missing from the series. The missing letters are given in a proper sequence as one of the alternatives. You have to choose the correct alternative.

EXAMPLE 9 abca _____ bcaab _____ ca _____ bbc _____ a

[AAO Exam]

Solution Proceed step by step as follows:

1. The first blank space should be filled using 'a'; so that the first alphabet doubles in the first step after 'abc'.
 2. The second blank space should be filled using 'b' so that in the second step both 'a' and 'b' doubles.
 3. The third blank space should be filled by 'a' and the fourth blank space should be filled by 'c' so that in the third stage, all characters 'a', 'b' and 'c' doubles.
Thus, the answer is abac.
So, the answer is (c).

EXERCISE 4

Directions: In each of the following letter series, some of the letters are missing which are given in that order as one of the alternatives below it. Choose the correct alternative.

Questions 1 to 5

[CBI Exam]

3. aab _____ ab _____ cabcca _____ bcab _____ c
(a) bbbc (b) bbab (c) cabc (d) cbab

4. ccbab _____ caa _____ bccc _____ a _____
(a) babb (b) bbba (c) baab (d) babc

5. _____ abb _____ bb _____ a _____ bbab _____ ba
(a) bababa (b) bbabbbb (c) ababaaa (d) aaaabb

Questions 6 to 10

[SSC]

6. ba _____ ba _____ bac _____ acb _____ cbac
(a) aacb (b) bbca (c) ccba (d) cbac

7. cc _____ ccbc _____ accbcc _____ c _____ b
(a) acac (b) abac (c) abab (d) aabc

8. aaa _____ bb _____ aab _____ baaa _____ bb
(a) abab (b) bbaa (c) babb (d) baab

9. acc _____ bc _____ a _____ cccbcc _____
(a) abab (b) bcaa (c) aabc (d) bcab

10. aab _____ bbaaa _____ cbba _____ abc _____ ba
(a) bcca (b) cbab (c) cbba (d) aabc

Questions 11 to 15

[AAO Exam]

Questions 16 to 20

(a) **Hotel Management**

ANSWERS

- 1.** (c) **2.** (c) **3.** (d) **4.** (a) **5.** (b) **6.** (c) **7.** (a) **8.** (c) **9.** (b) **10.** (b)
11. (a) **12.** (d) **13.** (c) **14.** (a) **15.** (b) **16.** (a) **17.** (c) **18.** (b) **19.** (d) **20.** (b)

Explanations

1. The series is a / bcaa / bcaa / bcaa / bcaa / bc
Thus, the pattern bcaa is repeated.
2. The series is babb / bbab / bbba / bbbb
Thus, in each sequence 'a' moves one step forward and 'b' takes its place and finally to the fourth sequence, where 'a' is eliminated.
3. The series is aa / bcab / bcab / ccaa / bcab / bc
Thus, the pattern ccaa followed by bcab repeated twice, makes up the series.
4. The series is ccba / bbca / aabc / ccba / b.
Thus, the pattern consists of first two letters moved 1 step backward and the third letter moved 1 step forward and the last letter remains the same in the first stage.
In the second stage, i.e. from second to third term, first two letters moved 1 step backward and last two letters moved 1 step backward.
In the third stage, first two letters moved 1 step backward, third letter unchanged and fourth letter moved 1 step forward.
In the fourth stage, first letter moved 1 step backward.
5. The series is babb / babb / babb / babb / ba. Thus pattern babb is repeated.
6. The series is bac / bac / bac / bac / bac / bac. Thus, the pattern bac is repeated.
7. The series is ccaccb / ccaccb / ccaccb. Thus, the pattern ccaccb is repeated.
8. The series is aaa / bbb / aaa / bbb / aaa / bbb.
9. The series is accb / bcca / accb / bcca. Thus, the pattern accb / bcca is repeated.
10. The series is aabcbba / aabcbba / aabcbba. Thus, the pattern aabcbb is repeated.
11. The series is aababcabcddcbacbaa. Thus, the letters equidistant from the beginning and the end of the series are the same.
12. The series is abcd / aabbccdd / aaabbbcccddd. Thus, each letter of first sequence is repeated two times in the second sequence and three times in the third sequence.
13. The series is aaa / bbbb / ccc / ddd / ccc / bbbb / a.
14. The series is abcd / bcad / cabd / abcd / bcad / cabd. Thus, the pattern abcd / bcad / cabd is repeated twice.
15. The series is adbcacbdbcddccbadbccabda. The letters equidistant from the beginning and end of the series are the same.
16. The series is aaab / aabb / abbb / aaab / aabb.
17. The series is abc / b / bca / c / cab / a / acb / b.
18. The series is bbca / bcca / bcaa / bbc.
19. The series is bac / accb / cbba / bac.
20. The series is ccacc / aabaa / bbcbb / cc.

Coding and Decoding

Coding is a method of transmitting a message between the sender and the receiver without a third person knowing it.

The coding and decoding test is set up to judge the candidate's ability to decipher the law that codes a particular message and break the code to reveal the message. In these questions, the candidate is required to find out the original words from code values assigned to the word.

TYPE I: LETTER CODING: In these types of questions, code values are assigned to a word in terms of the alphabet and the requirement may be.

Case I: Coding: To form the code for the given word.

EXAMPLE 1 If in a certain language, TAP is coded as SZO, then how will FREEZE be coded ?

- (a) ESDFYF (b) GQFDYF (c) EQDFYG (d) EQDDYD

Solution Clearly, each letter in the code is the alphabet before the corresponding letter in the word.

$$\begin{array}{ccc} S & Z & O \\ & \uparrow & \\ T & A & P \end{array}$$

Thus, in FREEZE, F is coded as E, R as Q, E as D and Z as Y. So, the answer is (d).

EXAMPLE 2 If in a certain language GAMBLE is coded as FBLCKF, how will FLOWER be coded in that code?

- (a) GKPVFQ (b) EMNXDS (c) GMPVDS (d) HNQYGT (e) EKNVDQ

Solution The letters preceding the letters at odd places of the word and those succeeding the even places of the word in the alphabets form the code. Hence the answer is (b).

EXAMPLE 3 If in a certain language PENSION is coded as NEISNOP, how will FOLIAGE be coded in that code?

- (a) OFILGAE (b) EOAILGF (c) FGLIAOE (d) EGAILOF (e) FILOGAE

Solution In the code, first and last letters are reversed, second and second last letters are the same, third and third last letters are reversed and the middle letter remains the same. Hence the answer is (b).

EXERCISE 1

1. If PLANE is coded as OKZMD in a certain language, how will TRAIN be coded?
 (a) SQZHM (b) UQBHO (c) SQZJM (d) USBJM (e) USBJO
2. If in a certain language; SPACE is coded as TQBDF, how will PURSE be coded in that code?
 (a) QTSRF (b) OVQTD (c) QVSTF (d) ESRUP (e) OTQRD
3. If in a certain language NATURE is coded as MASUQE, how is FAMINE coded in that code?
 (a) FBMJND (b) FZMHND (c) GANIOE (d) EALIME (e) FZNJME
4. If in a certain language SECURE is coded as ERUCES, how is SALINE coded in that code?
 (a) SALIQE (b) EALINS (c) ENILAS (d) ERUCES (e) SLANIE
5. If in a certain language MECHANICS is coded as HCEMASCIN, how is POSTER coded in that code?
 (a) OPTSRE (b) SOPRET (c) RETSOP (d) TERPOS (e) POTSER
6. If in a certain language DISPEL is coded as IDPSLE, how is EFFECT coded in that language?
 (a) FEEFTC (b) CTFEEF (c) EFFFTC (d) ECTEFF (e) EEFFCT
7. If BATCH is coded as ABSDG, how is FORSAKE coded in that code?
 (a) ABDGS (b) EPQTZLD (c) EQPZLTD (d) GDSBA (e) None of these
8. In a certain code, GOODNESS is coded as HNPCODTR. How is GREATNESS coded in that code?
[SBI PO]
 (a) HQFZUODTR (b) HQFZUMFRT (c) HQFZSMFRT
 (d) FSDBSODTR (e) HQFZUFRT
9. If FOUGHT is coded as EQRKCZ, how will MALE be coded?
 (a) LCH (b) NZMD (c) KCMI (d) NBIF (e) LBID
10. If in a certain language BLEMISH is coded as AODPHVG, how will CHAPTER be coded in that code?
 (a) DEBOVTDR (b) BKZSSHQ (c) CAHTPRE (d) BGAQMFP (e) ADGIQFS

ANSWERS

1. (a) 2. (c) 3. (d) 4. (c) 5. (b) 6. (a) 7. (b) 8. (b) 9. (a) 10. (b)

Explanations

1. The letter preceding each letter of the given word in the alphabet is taken as the subsequent letter of its code.
2. Each letter of the given word is moved one step ahead to obtain the subsequent letter of its code.
3. The letters preceding the letters at odd places in the given word are taken as the corresponding letters of the code while those at even places remain the same.

4. The word is wholly reversed in the code.
5. In the code the first four and the last four letters are reversed in order.
6. In the code, every two letters are reversed in order.
7. In the code, the letters at odd places are one place before and those at even place are one place after the corresponding letter in the word.
8. In the code the letters at odd places are one alphabet ahead and those at even places are one alphabet before the corresponding letter in the word.
9. In the code the first letter is one place before, the second letter is two places ahead the third letter is three places before, the fourth letter is four places ahead, and so on.
10. In the code, the letters at odd places are one place before and those at even places are three places ahead of the corresponding letters in the word.

Case II: Decoding: To find the word from the given code. In decoding, instead of finding a code for a given word, you have to find the word from the given code.

EXAMPLE 4 If in a certain code, ALMIRAH is written as BNPMWGO, which word would be written as DNRWLUA?

- (a) COSGOLT (b) TOGSOLC (c) TOGCLOS (d) CLOSGOT (e) COLSTOG

Solution In the code, the first letter is one place ahead, the second letter is two places ahead and so on than the corresponding letter in the word.

So apply the same in the reverse direction to the given code so as to find the word. Therefore the answer is (d).

EXAMPLE 5 If in a certain code, SWITCH is written as TVJSDG, which word would be written as CQFZE?

- (a) BARED (b) BRAED (c) BREAD (d) BRADE (e) BRDAE

Solution Each letter in the code is one place ahead in odd places and one place before in even places from the corresponding letters of the word. So the answer is (c).

EXAMPLE 6 In a certain code language, REFRIGERATOR is coded as ROTAREGIRFER. Which word would be coded as NOITINUMMA?

- (a) ANMOMIUTNI (b) AMNTOMUIIN (c) AMMUNITION
 (d) NMMUNITIOA (e) None of these

Solution The order of letters of the word is reversed in the code. So, reverse the letters in the code to get the word. So the answer is (c).

EXERCISE 2

1. If in a certain language, UTENSIL is coded as WVGPUKN, which word would be coded as DMSFXG?
 (a) BKQEVE (b) BKQDWE (c) BKQDWF (d) BKQDVF (e) BKQDVE
2. If in a certain code language, REMOTE is coded as ROTEME, which word would be coded as PNIICC?
 (a) NPIICC (b) PICCIN (c) PINCIC (d) PICNIC (e) PICINC
3. If in a certain language, SHIFT is coded as RFFBO, which word would be coded as LKUMB?
 (a) MMXQG (b) MLVNC (c) KJVLA (d) MJVLC (e) KJTLA

4. If in a certain language, TRIANGLE is coded as SQHZMFKD, which word would be coded as DWZLOKD?
 (a) EXAMPLE (b) FIGMENT (c) DISMISS (d) DISJOIN (e) None of these
5. If in a certain language GRASP is coded as BMVNK, which word would be coded as CRANE?
 (a) FUDQH (b) HWFSJ (c) GVERI (d) XMVIZ (e) BQZMD
6. If in a certain language, MACHINE is coded as LBBIHOD, which word would be coded as SLTMFNB?
 (a) RKSLEMA (b) TKULGMC (c) RMSNEOA (d) TMUNGOC (e) TMUNGMC
7. If in a certain language PORCELAIN is coded as QOSCFLBJO, which word is coded as BKMOUSPP?
 (a) ALTOLROPY (b) ALLOTROPY (c) ALOTROLPY
 (d) ATLOROPLY (e) None of these
8. If in a certain language LBAEHC is the code for the word BLEACH, then which of the following is coded as NBOLZKMH?
 (a) OBNKLHM (b) LOBNHMKZ (c) OCPMALNI (d) MANKYJLG (e) BNLOKZHM
9. If in a certain language POPULAR is coded as QPQVMBS, which word would be coded as GBNPVT?
 (a) FAMOSU (b) FAMOUS (c) FASOUM (d) FOSAUM (e) FAMSUO
10. If in a certain language, CRICKET is coded as FULFNHW, then EULGH is the code for which word?
 (a) PRIDE (b) BRIDE (c) BLADE (d) BLIND (e) None of these

ANSWERS

1. (e) 2. (d) 3. (a) 4. (a) 5. (b) 6. (b) 7. (b) 8. (e) 9. (b) 10. (b)

Explanations

1. Each letter of the word is two place behind the corresponding letters of the code. So the answer is (e).
2. The groups of second and third letters and fourth and fifth letters in the word interchange places in the code.
3. The first, second, third, fourth and fifth letters of the word are respectively one, two, three, four and five places ahead of the corresponding letters of the code.
4. Each letter of word is one place ahead of corresponding letter of the code.
5. Each letter of the word is five place ahead of the corresponding letter of the code.
6. In the code, we have alternatively one letter one place behind and the other one place ahead of the corresponding letter in the word.
7. In the code, we have one letter one place ahead of the corresponding letter in the word and the other letter coming in the even places remain unchanged.
8. The word is formed into pairs of letters and letters in each pair is reversed.
9. Each letter of the word is one place behind the corresponding letter of the code.
10. Each letter of the word is three places behind the corresponding letter of the code.

TYPE II: NUMBER CODING: In these type of questions, either numerical code values are assigned to a word or alphabetical code values are assigned to numbers. You have to analyse the code as per the directions.

Case I: When numerical values are assigned to words.

EXAMPLE 7 If in a certain code language SISTER is coded as 535301, UNCLE as 84670 and BOY as 129, how will SON be coded in that code language?

- (a) 524 (b) 643 (c) 353 (d) 846 (e) None of these

Solution: Clearly, in the given code, the alphabets are coded as:

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| S | I | T | E | R | U | N | C | L | B | O | Y |
| 5 | 3 | 3 | 0 | 1 | 8 | 4 | 6 | 7 | 1 | 2 | 9 |

So, S is coded as 5, O is coded as 2 and N is coded as 4. Hence correct code is 524. Therefore, the answer is (a).

EXAMPLE 8 If GIVE is coded as 5137 and BAT is coded as 924, how is GATE coded?

- (a) 5427 (b) 5724 (c) 5247 (d) 2547 (e) None of these

Solution: Here the alphabet are coded as follows:

| | | | | | | |
|---|---|---|---|---|---|---|
| G | I | V | E | B | A | T |
| 5 | 1 | 3 | 7 | 9 | 2 | 4 |

So G is coded as 5, A is coded as 2, T is coded as 4 and E is coded as 7. Hence correct code is 5247. Therefore the answer is (c).

EXERCISE 3

- In a certain code, PALE is written as 2134, EARTH is written as 41590, how will PEARL be written in that code?
 (a) 29530 (b) 24153 (c) 25413 (d) 25430 (e) None of these
- In a certain code, RIPPLE is written as 613382 and LIFE is written as 8192. How will RIFFLE be written in that code?
 (a) 968812 (b) 869912 (c) 619982 (d) 269981 (e) None of these
- If ROSE is coded as 6821, CHAIR is coded as 73456 and PREACH is coded as 961473, what will be the code for SEARCH?
 (a) 246173 (b) 214673 (c) 214763 (d) 216473 (e) None of these
- If in a certain code language, TWENTY is written as 863985 and ELEVEN is written as 323039, how will TWELVE be written in that code?
 (a) 863203 (b) 863584 (c) 863903 (d) 863063 (e) None of these
- If A is coded as 1, B is coded as 2, and so on, how is HIGH coded in that code?
 (a) 9879 (b) 7897 (c) 8978 (d) 8798 (e) None of these

Directions (Questions 6 to 8): If in a certain language ENTRY is coded as 12345 and STEADY is coded as 931785, then state which is the correct code for each of the given words.

- NEATNESS
 (a) 2956169 (b) 21732199 (c) 21362199 (d) 21823698 (e) None of these
- ARREST
 (a) 744589 (b) 744193 (c) 166479 (d) 745194 (e) 188924
- ENDEAR
 (a) 524519 (b) 174189 (c) 128174 (d) 124179 (e) 164983

Directions (Questions 9 to 11): If in a certain language CHARCOAL is coded as 45164913 and MORALE is coded as 296137, how are the following words coded in that language?

9. REAL

- (a) 8519 (b) 6713 (c) 6513 (d) 6719 (e) None of these

10. COACH

- (a) 38137 (b) 49148 (c) 48246 (d) 49145 (e) None of these

11. COLLAR

- (a) 397758 (b) 497758 (c) 483359 (d) 493316 (e) None of these

Directions (Questions 12 to 15): If MISTAKE is coded as 9765412 and NAKED is coded as 84123, how are the following words coded?

12. DISTANT

- (a) 3765485 (b) 4798165 (c) 3697185 (d) 4768296 (e) None of these

13. ASSIST

- (a) 166762 (b) 466765 (c) 488976 (d) 435985 (e) 166872

14. INTIMATE

- (a) 89786145 (b) 79438163 (c) 78579452 (d) 78698365 (e) None of these

15. STAIN

- (a) 98175 (b) 89483 (c) 68194 (d) 65478 (e) None of these

16. If ROPE is coded as 6821 and CHAIR is coded as 73456 then what will be the code for CRAPE?

- (a) 73456 (b) 76421 (c) 77246 (d) 77123 (e) None of these

17. If PLAY is coded as 8123 and RHYME is coded as 49367, then how is MALE coded?

- (a) 6217 (b) 6198 (c) 6395 (d) 6285 (e) None of these

18. If in a certain language PRIVATE is coded as 1234567 and RIST is coded as 2396, then how is RIVETS coded in that language?

- (a) 687543 (b) 234769 (c) 496321 (d) 246598 (e) None of these

19. In a certain code language 24685 is written as 33776. How is 35791 written in that code?

- (a) 44882 (b) 44880 (c) 46682 (d) 44682 (e) None of these

20. In a certain code language 35796 is written as 44887. How is 46823 written in that code?

- (a) 57914 (b) 55914 (c) 55934 (d) 55714 (e) None of these

ANSWERS

1. (b) 2. (c) 3. (b) 4. (a) 5. (c) 6. (b) 7. (b) 8. (c) 9. (b) 10. (d)
11. (d) 12. (a) 13. (b) 14. (c) 15. (d) 16. (b) 17. (a) 18. (b) 19. (a) 20. (b)

Explanations

1. The alphabets in the word are coded as shown below:

| | | | | | | |
|---|---|---|---|---|---|---|
| P | A | L | E | R | T | H |
| ↓ | ↓ | ↓ | ↓ | ↓ | ↓ | ↓ |
| 2 | 1 | 3 | 4 | 5 | 9 | 0 |

So PEARL is coded as 24153.

2. The alphabets in the word are coded as shown below:

| | | | | | |
|---|---|---|---|---|---|
| R | I | P | L | E | F |
| 6 | 1 | 3 | 8 | 2 | 9 |

So RIFFLE is coded as 619982.

3. The alphabets in the word are coded as shown below:

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| R | O | S | E | C | H | A | I | P |
| 6 | 8 | 2 | 1 | 7 | 3 | 4 | 5 | 9 |

So SEARCH is coded as 214673.

4. The alphabets in the word are coded as shown below:

| | | | | | | |
|---|---|---|---|---|---|---|
| T | W | E | N | Y | L | V |
| 8 | 6 | 3 | 9 | 5 | 2 | 0 |

So TWELVE is written as 863203.

5. The alphabets in the word are coded as shown below:

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| A | B | C | D | E | F | G | H | I |
| ↓ | ↓ | ↓ | ↓ | ↓ | ↓ | ↓ | ↓ | ↓ |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |

So HIGH is coded as 8978.

Questions 6 to 8: The alphabets in the word are coded as follows:

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| E | N | T | R | Y | S | A | D |
| ↓ | ↓ | ↓ | ↓ | ↓ | ↓ | ↓ | ↓ |
| 1 | 2 | 3 | 4 | 5 | 9 | 7 | 8 |

6. So NEATNESS is coded as 21732199.

7. So ARREST is coded as 744193.

8. So ENDEAR is coded as 128174.

Questions 9 to 11: The alphabets in the word are coded as follows:

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| C | H | A | R | O | L | M | E |
| 4 | 5 | 1 | 6 | 9 | 3 | 2 | 7 |

9. So REAL is coded as 6713.

10. So COACH is coded as 49145.

11. So COLLAR is coded as 493316.

Questions 12 to 15: The alphabets in the word are coded as shown below:

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| M | I | S | T | A | K | E | N | D |
| 9 | 7 | 6 | 5 | 4 | 1 | 2 | 8 | 3 |

12. So DISTANT is coded as 3765485.

13. So ASSIST is coded as 466765.

14. So INTIMATE is coded as 78579452.

15. So STAIN is coded as 65478.

16. The alphabets in the word are coded as shown below:

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| R | O | P | E | C | H | A | I |
| 6 | 8 | 2 | 1 | 7 | 3 | 4 | 5 |

So CRAPE is coded as 76421.

17. The alphabets are coded as shown below:

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| P | L | A | Y | R | H | M | E |
| 8 | 1 | 2 | 3 | 4 | 9 | 6 | 7 |

So MALE is coded as 6217.

18. The alphabets are coded as follows:

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| P | R | I | V | A | T | E | S |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 9 |

So RIVETS is coded as 234769.

19. Here, in the code, the letters at odd places are one place ahead and those at even places are one place before the corresponding letter in the word.

| | | | | | | |
|---|---|---|---|---|---|------|
| 2 | 4 | 6 | 8 | 5 | → | word |
| ↓ | ↓ | ↓ | ↓ | ↓ | | |
| 3 | 3 | 7 | 7 | 6 | → | code |

So 3 is coded as 4, 5 as 4, 7 as 8, 9 as 8 and 1 as 2. So 35791 is coded as 44882.

20. Here code follows same pattern as in Q. 19.

So 46823 is coded as 55914.

Blood Relations

TYPE 1

In these tests, the success of a candidate depends upon the knowledge of the blood relations.

Important Relations

| | | |
|---------------------------------|---|-----------------|
| Mother's or father's son | : | Brother |
| Mother's or father's daughter | : | Sister |
| Mother's or father's brother | : | Uncle |
| Mother's or father's sister | : | Aunt |
| Mother's or father's mother | : | Grandmother |
| Mother's or father's father | : | Grandfather |
| Son's wife | : | Daughter-in-law |
| Daughter's husband | : | Son-in-law |
| Husband's or wife's sister | : | Sister-in-law |
| Husband's or wife's brother | : | Brother-in-law |
| Brother's son | : | Nephew |
| Brother's daughter | : | Niece |
| Uncle or aunt's son or daughter | : | Cousin |
| Sister's husband | : | Brother-in-law |
| Brother's wife | : | Sister-in-law |

EXAMPLE 1 Pointing to a photograph, a man tells his friend, 'She is the daughter of the only son of my father's wife'. How is the girl in the photograph related to the man?

- (a) Daughter (b) Cousin (c) Mother (d) Sister (e) Niece

Solution The relation may be represented as follows:

Father's wife—mother; mother's only son—himself. So the girl is man's daughter and the answer is (a).

EXAMPLE 2 Pointing to a lady, Suresh said, 'She is the daughter of the woman, who is the mother of the husband of my mother'. What is the relation of the lady to Suresh?

- | | | |
|------------|-------------------|--------------|
| (a) Aunt | (b) Granddaughter | (c) Daughter |
| (d) Sister | (e) Sister-in-law | |

Solution The relation may be represented as follows:

Mother's husband—Father; Father's mother—Grandmother; Grandmother's daughter—Father's sister; Father's sister is Aunt. So the lady is Suresh's aunt and the answer is (a).

EXAMPLE 3 A girl introduced a boy as the son of the daughter of the father of her uncle. The boy is girl's _____.

- | | | | | |
|-------------|---------|-----------|----------------|------------|
| (a) Brother | (b) Son | (c) Uncle | (d) Son-in-law | (e) Nephew |
|-------------|---------|-----------|----------------|------------|

Solution The relation may be represented as follows:

Father of uncle—Grandfather; Daughter of grandfather—Uncle's sister or mother; Son of mother—Brother. So the answer is (a).

EXERCISE 1

1. Introducing a man to her husband, a woman said his brother's father is the only son of my grandfather. How is the woman related to this man? [Bank PO]

| | | | | |
|------------|----------|------------|--------------|-----------------|
| (a) Mother | (b) Aunt | (c) Sister | (d) Daughter | (e) Grandmother |
|------------|----------|------------|--------------|-----------------|
2. Pointing to a lady a girl said, 'She is the daughter-in-law of the grandmother of my father's only son'. How is the lady related to the girl?

| | | |
|-------------------|------------|----------|
| (a) Sister-in-law | (b) Mother | (c) Aunt |
| (d) Mother-in-law | (e) Cousin | |
3. Introducing a man a woman said, He is the only son of my mother's mother. How is the woman related to the man? [Officer's Grade]

| | | | | |
|------------|----------|------------|-----------|-------------------|
| (a) Mother | (b) Aunt | (c) Sister | (d) Niece | (e) None of these |
|------------|----------|------------|-----------|-------------------|
4. Introducing a man, a woman said, 'His wife is the only daughter of my father'. How was that man related to the woman? [AO Exam]

| | | |
|-------------|-------------------|--------------------|
| (a) Brother | (b) Father-in-law | (c) Maternal uncle |
| (d) Husband | (e) None of these | |
5. Showing a lady in the park, Ashok said, 'She is the daughter of my grandfather's only son'. How is Ashok related to that lady? [Bank PO]

| | | | | |
|-------------|------------|------------|-----------|-------------------|
| (a) Brother | (b) Cousin | (c) Father | (d) Uncle | (e) None of these |
|-------------|------------|------------|-----------|-------------------|
6. Pointing to a man in a photograph, a woman said, 'His brother's father is the only son of my grandfather'. How is the woman related to the man in the photograph? [SBI PO]

| | | | | |
|------------|----------|------------|--------------|-----------------|
| (a) Mother | (b) Aunt | (c) Sister | (d) Daughter | (e) Grandmother |
|------------|----------|------------|--------------|-----------------|
7. Pointing to a person a man said to a woman, 'His mother is the only daughter of your father'. How was the woman related to the person?

| | | | | |
|----------|------------|----------|--------------|-------------------|
| (a) Aunt | (b) Mother | (c) Wife | (d) Daughter | (e) None of these |
|----------|------------|----------|--------------|-------------------|
8. Arun said, 'This girl is the wife of the grandson of my mother'. Who is Arun to the girl?

| | | |
|-------------------|-------------------|-------------|
| (a) Father | (b) Grandfather | (c) Husband |
| (d) Father-in-law | (e) None of these | |
9. Pointing to a lady, a man said, 'The son of her only brother is the brother of my wife'. How is the lady related to the man?

| | | |
|-----------------------------|-------------------|-------------------|
| (a) Mother's sister | (b) Grandmother | (c) Mother-in-law |
| (d) Sister of father-in-law | (e) Maternal aunt | |

10. Pointing to a lady on the platform, Anju said, 'She is the sister of the father of my mother's son'. Who is the lady to Anju?
 (a) Mother (b) Sister (c) Aunt (d) Niece (e) None of these

ANSWERS

1. (c) 2. (b) 3. (d) 4. (d) 5. (a) 6. (c) 7. (a) 8. (d) 9. (d) 10. (c)

Explanations

- Only son of her grandfather—her father; man's brother's father — man's father; So man's father is her father. i.e. She is man's sister.
- My father's only son—My brother; grandmother of my brother—My grandmother; Daughter-in-law of my grandmother—My mother. So the lady is girl's mother.
- My mother's mother—my grandmother; My grandmother's only son—my maternal uncle. So, the woman is man's niece.
- Only daughter of my father—myself; So, man is woman's husband.
- Grandfather's only son—father; Daughter of father—sister. So Ashok is lady's brother.
- Only son of woman's grandfather—woman's father; Man's brother's father—Man's father. So, the woman is man's sister.
- Only daughter of your father—your sister; Person's mother—woman's sister. So the woman is person's aunt.
- Mother's grandson—son; Son's wife—daughter-in-law. So, Arun is the father-in-law of the girl.
- Brother of my wife—My brother-in-law; Son of lady's brother is brother-in-law of man. So lady's brother is man's father-in-law. i.e. Lady is sister of man's father-in-law.
- Mother's son—brother; My brother's father—father; my father's sister—aunt; So the lady is Anju's aunt.

TYPE 2

In this type mutual blood relations or other information of more than two persons are mentioned and information about any two is questioned.

EXAMPLE 4 A and B are married couple. X and Y are brothers. X is the brother of A. How is Y related to B?

- (a) Brother-in-law (b) Brother (c) Son-in-law
 (d) Cousin (e) None of these

Solution A and B are husband and wife. Since X and Y are brothers, and X is the brother of A, Y is also the brother of A. Thus Y is the brother-in-law of B. Hence the answer is (a).

EXAMPLE 5 A and B are brothers, C and D are sisters. A's son is D's brother. How is B related to C?

- (a) Father (b) Brother (c) Grandfather
 (d) Uncle (e) None of these

Solution Clearly, the relations can be as follows. B is the brother of A. A's son is D's brother. i.e. D is the daughter of A and hence C is also the daughter of A. So, B is the uncle of C. Hence the answer is (d).

EXAMPLES 6–11

Read the following information carefully and answer the questions given below.

All the six members of a family A, B, C, D, E, and F are travelling together. B is the son of C but C is not the mother of B. A and C are a married couple. E is the brother of C. D is the daughter of A. F is the brother of B.

6. How many male members are there in the family?
 (a) 1 (b) 3 (c) 2 (d) 4 (e) 5
7. Who is the mother of B?
 (a) D (b) F (c) E (d) A (e) None of these
8. How many children does A have?
 (a) One (b) Two (c) Three (d) Four (e) None of these
9. Who is the wife of E?
 (a) A (b) F (c) B
 (d) Can't be determined (e) None of these
10. Which of the following is a pair of females?
 (a) A, E (b) B, D (c) D, F (d) A, D (e) None of these
11. How is E related to D?
 (a) Father (b) Brother (c) Uncle
 (d) Can't be determined (e) None of these

Solution B is the son of C but C is not the mother of B means C is the father of B. A is married to C means A is the mother of B. F is brother of B means F is the son of A and C. E is the brother of C. D is the daughter of A.

i.e. D is the daughter of A and C.

Therefore, E is the uncle of D.

6. A is the mother and hence female. B is the son and hence male. C is the husband and hence male. D is the daughter and hence female. E is the brother and hence male. F is the son and hence male. So there are four males. The answer is (d).
7. Clearly A is the mother of B. The answer is (d).
8. A has son B, son F and daughter D. i.e. three children. The answer is (c).
9. Clearly, from the data available, the wife of E cannot be determined. The answer is (d).
10. Clearly, the females are only the mother A and the daughter D. The answer is (d).
11. E is the brother of C who is the father of D. So, E is the uncle of D. The answer is (c).

EXERCISE 2

Read the following information and answer the questions that follow (Q. 1–4).

A is the son of B; C, B's sister has a son D and a daughter E; F is the maternal uncle of D.

1. How is A related to D?
 (a) Cousin (b) Nephew (c) Uncle (d) Brother (e) None of these
2. How is E related to F?
 (a) Sister (b) Daughter (c) Niece (d) Wife (e) None of these

3. How many nephews does F have?
 (a) Nil (b) One (c) Two (d) Three (e) None of these
4. How is F related to E?
 (a) Uncle (b) Brother (c) Maternal uncle
 (d) Nephew (e) None of these
5. P is the son of Q while Q and R are the sisters to one another. T is the mother of R. If S is the son of T, which of the following statement is correct?
 (a) T is the brother of Q (b) S is the cousin of P
 (c) Q and S are sisters (d) S is the maternal uncle of P
 (e) R is the grandfather of P
6. P is the brother of Q and R. S is R's mother. T is father of P. Which of the following statement cannot be definitely true?
 (a) T is father of Q (b) S is mother of P (c) P is son of S
 (d) T is husband of S (e) Q is son of T
7. A and B both are children of C. If C is the mother of A, A is the son of C but B is not the daughter of C, how are A and B mutually related?
 (a) A is the brother of B (b) A is the sister of B (c) A is the cousin of B
 (d) A is the nephew of B (e) None of these
8. E is the son of A. D is the son of B. E is married to C. C is daughter of B. How is D related to E?
 (a) Brother (b) Uncle (c) Father-in-law
 (d) Brother-in-law (e) None of these
9. A woman walking with a boy meets another woman and on being asked about her relationship with the boy, she says, 'My maternal uncle and his maternal uncle's maternal uncle are brothers'. How is the boy related to the woman?
 (a) Nephew (b) Son (c) Grandson (d) Husband (e) Brother-in-law
10. P is the brother of D. X is the sister of P. A is the brother of F. F is the daughter of D. M is the father of X. Who is the uncle of A?
 (a) X (b) P (c) F (d) M (e) None of these
- Read the following information carefully and answer the questions that follow (Q. 11-14).**
 Five persons namely P, Q, X, Y, and Z are sitting on a park. P is the mother of X who is the wife of Z. Y is the brother of P and Q is the husband of P.
11. How is P related to Z?
 (a) Mother (b) Aunt (c) Sister
 (d) Mother-in-law (e) None of these
12. How is Y related to Q?
 (a) Brother (b) Brother-in-law (c) Cousin
 (d) Uncle (e) Son
13. How is X related to Q?
 (a) Daughter (b) Daughter-in-law (c) Niece
 (d) Aunt (e) Mother
14. How is Q related to Z?
 (a) Father-in-law (b) Brother-in-law (c) Father
 (d) Mother-in-law (e) None of these

Study the following information and answer the questions (15–19).

There is a family of six persons A, B, C, D, E, and F. They are lawyer, doctor, teacher, salesman, engineer and accountant. There are two married couples in the family. D, the salesman is married to the lady teacher. The doctor is married to the lawyer. F, the accountant is the son of B and brother of E. C, the lawyer is the daughter-in-law of A. E, is the unmarried engineer. A, is the grandmother of F.

15. How is E related to F?

- | | | |
|-------------------------|-------------------|------------|
| (a) Brother | (b) Sister | (c) Cousin |
| (d) Can't be determined | (e) None of these | |

16. What is the profession of B?

- | | | |
|-------------------------|-------------------|------------|
| (a) Teacher | (b) Doctor | (c) Lawyer |
| (d) Can't be determined | (e) None of these | |

17. Which is the profession of A?

- | | | |
|-------------------------|-------------------|------------|
| (a) Lawyer | (b) Teacher | (c) Doctor |
| (d) Can't be determined | (e) None of these | |

18. Which of the following is one of the couples?

- | | | | | |
|-------------|-------------|-------------|-------------|-------------------|
| (a) F and D | (b) D and B | (c) E and A | (d) A and C | (e) None of these |
|-------------|-------------|-------------|-------------|-------------------|

19. How is D related to F?

- | | | | | |
|-----------------|------------|-----------|-------------|-------------------|
| (a) Grandfather | (b) Father | (c) Uncle | (d) Brother | (e) None of these |
|-----------------|------------|-----------|-------------|-------------------|

Read the following information carefully and answer the questions (20–25).

A family consists of six members P, Q, R, X, Y, and Z. Q is the son of R but R is not the mother of Q. P and R are a married couple. Y is the brother of R. X is the daughter of P. Z is the brother of P.

20. Who is the brother-in-law of R?

- | | | | | |
|-------|-------|-------|-------|-------------------|
| (a) P | (b) Z | (c) Y | (d) X | (e) None of these |
|-------|-------|-------|-------|-------------------|

21. Who is the father of Q?

- | | | |
|-------------------------|-------------------|-------|
| (a) P | (b) Z | (c) R |
| (d) Can't be determined | (e) None of these | |

22. How many children does P have?

- | | | | | |
|----------|-----------|---------|---------|-------------------|
| (a) Four | (b) Three | (c) Two | (d) One | (e) None of these |
|----------|-----------|---------|---------|-------------------|

23. How many female members are there in the family?

- | | | | | |
|---------|---------|-----------|----------|----------|
| (a) One | (b) Two | (c) Three | (d) Four | (e) Five |
|---------|---------|-----------|----------|----------|

24. How is Q related to X?

- | | | | | |
|-----------|-------------|------------|-------------|-------------------|
| (a) Uncle | (b) Brother | (c) Father | (d) Husband | (e) None of these |
|-----------|-------------|------------|-------------|-------------------|

25. Which is a pair of brothers?

- | | | | | |
|-------------|-------------|-------------|-------------|-------------------|
| (a) R and Y | (b) Q and X | (c) P and Z | (d) P and X | (e) None of these |
|-------------|-------------|-------------|-------------|-------------------|

Read the following information carefully and answer the questions (26–30).

A family consists of six members P, Q, R, S, T, and U. There are two married couples. Q is a doctor and the father of T. U is the grandfather of R and is a contractor. S is grandmother of T and is a housewife. There is one doctor, one contractor, one nurse, one housewife and two students in the family.

26. Who is the husband of P?

- | | | | | |
|-------|-------|-------|-------|-------|
| (a) R | (b) U | (c) Q | (d) S | (e) T |
|-------|-------|-------|-------|-------|

ANSWERS

- 1.** (a) **2.** (c) **3.** (c) **4.** (a) **5.** (d) **6.** (e) **7.** (a) **8.** (d) **9.** (b) **10.** (b)
11. (d) **12.** (b) **13.** (a) **14.** (a) **15.** (d) **16.** (b) **17.** (b) **18.** (e) **19.** (a) **20.** (b)
21. (c) **22.** (c) **23.** (b) **24.** (b) **25.** (a) **26.** (c) **27.** (a) **28.** (b) **29.** (b) **30.** (a)

Explanations

1. A is the son of B. D is the son of B's sister. So A is the cousin of D.
 2. E is the daughter of C and D is the son of C. So, F, who is the maternal uncle of D, is also maternal uncle of E. Thus, E is the niece of F.
 3. Clearly, F is the maternal uncle of D means F is the brother of D's mother, i.e. F is the brother of C. C is the sister of B. So, F is the brother of B, who is mother of A. Thus, F is the maternal uncle of A. So, A and D are the nephews of F. i.e. F has two nephews.
 4. From Q. 2, E is the niece of F, who is a male. So, F is the uncle of E.
 5. Q and R are sisters. So, T is the mother of R means T is the mother of Q and R. S is the son of T means S is the brother of Q. Thus, P is the son of Q means S is the maternal uncle of P.
 6. P, Q and R are children of the same parents. So, S who is mother of R and T, who is father of P will be mother and father of all three. However, it is not mentioned whether Q is male or female. So (e) can't be definitely true.
 7. B is the child of C, but not daughter means B is the son of C. Also, A is the son of C. So, A is the brother of B.
 8. C is B's daughter and D is B's son. So, D is the brother of C. E is a male married to C. So, E is the husband of C, whose brother is D. So, D is the brother-in-law of E.
 9. Boy's maternal uncle will be brother of boy's mother. Maternal uncle of mother's brother and maternal uncle of lady are brothers means lady is sister to mother's brother. i.e., lady is the mother of the boy. So, the boy is woman's son.
 10. A is the brother of F who is the daughter of D. So, A is the son of D. P is the brother of D. So, P is the uncle of A.
 11. P is the mother of X who is the wife of Z. So, P is the mother-in-law of Z.
 12. Q is the husband of P means P is the wife of Q. So, Y is the brother of P who is the wife of Q. Thus, Y is the brother-in-law of Q.
 13. P is the mother of X who is a female. So, X is the daughter of P. Q is the husband of P. Thus, X is the daughter of Q.
 14. P is the mother-in-law of Z. So, Q, the husband of P will be father-in-law of Z.

Questions (15 to 19)

Given E is the unmarried engineer. C is the daughter-in-law of A who is the grandmother of F means C is the mother of F. But F is the son of B. So, B is the husband of C. But C, the lawyer is married to the doctor. Thus C, the lawyer is the wife of B who is a doctor. F, the accountant will be the son of B and C. So, the other married couple can be that of grandmother of F. i.e. A and D. But D, the salesman is married to the lady teacher. So D, the salesman is the grandfather of F, father of B and the husband of A, the lady teacher.

15. Clearly, from the given data the relation between E and F cannot be determined.
16. Clearly, B is a doctor.
17. A is the lady teacher.
18. The two couples are C and B; and D and A which is none among the choices.
19. D is the grandfather of F.

Questions (20 to 25)

Q is the son of R but R is not the mother. So, R is the father of Q. P is married to R. So, P is the wife of R and the mother of Q. X is the daughter of P and hence of R and so it is the sister of Q. Y is the brother of R and Z is the brother of P.

20. R is the husband of P and Z is the brother of P. So, Z is the brother-in-law of R.
21. R is the father of Q.
22. Clearly, Q is the son of P and X is the daughter of P. So P has two children.
23. There are two females only—mother P and daughter X.
24. X is the sister of Q who is a male. So, Q is the brother of X.
25. Clearly, Y is the brother of R who is a male. So, Y and R are a pair of brothers.

Questions (26 to 30)

Q, the doctor, is the father of T. S, the housewife, is the grandmother of T and hence the mother of Q. Since there are only two married couples one being that of Q, the grandfather of R, i.e. U must be married to S. Thus, R and T will be both children of Q and these must be the students. So, P, who remains, shall be the wife of Q and she alone can be the nurse. Thus, U must be the contractor.

26. The husband of P will be Q.
27. Clearly, R and T are children of the same parents. So, R will be the sister of T.
28. P is the nurse.
29. The two married couples are Q, P and U, S.
30. Clearly, the males are Q, the father, and U, the grandfather.

TYPE 3**Coded Relationships**

In such questions, the relationships are represented by certain codes or symbols such as +, ×, −, ÷ etc. Then relationships between certain persons, given in the form of these codes, are to be analysed.

EXAMPLES (12–15)

Read the following information carefully and answer the questions that follow:

A + B means A is the son of B; A – B means A is the wife of B; A × B means A is the brother of B; A ÷ B means A is the mother of B and A = B means A is the sister of B.

12. What does P + R – Q means?

| | |
|--------------------------|---------------------------|
| (a) Q is the father of P | (b) Q is the son of P |
| (c) Q is the uncle of P | (d) Q is the brother of P |

13. What does $P \times R \div Q$ mean?
 (a) P is the brother of R
 (c) P is the uncle of Q
 (b) P is the father of Q
 (d) P is the nephew of Q
14. What does $P = R + Q$ mean?
 (a) P is the aunt of Q
 (c) P is the niece of Q
 (b) P is the daughter of Q
 (d) P is the sister of Q
15. What does $P = R \div Q$ mean?
 (a) P is the aunt of Q
 (c) Q is the niece of P
 (b) P is the sister of Q
 (d) Q is the daughter of P

Solution

12. $P + R - Q$ means P is the son of R who is the wife of Q. i.e. Q is the father of P. So, the answer is (a).
13. $P \times R \div Q$ means P is the brother of R who is the mother of Q. i.e., P is the uncle of Q. So the answer is (c).
14. $P = R + Q$ means P is the sister of R who is the son of Q. i.e. P is the daughter of Q. So, answer is (b).
15. $P = R \div Q$ means P is the sister of R who is the mother of Q. i.e., P is the aunt of Q. So the answer is (a).

EXERCISE 3

Read the following information carefully and answer the questions that follow: (Q. 1–8).
 $A \div B$ means A is the father of B, $A - B$ means A is the wife of B; $A \times B$ means A is the brother of B, $A \div B$ means A is the daughter of B.

1. If $P \div R + S + Q$, which of the following is true?
 (a) P is the daughter of Q (b) Q is the aunt of P (c) P is the aunt of Q
 (d) P is the mother of Q (e) None of these
2. If $P - R + Q$, which of the following statement is true?
 (a) P is the mother of Q (b) Q is the daughter of P (c) P is the aunt of Q
 (d) P is the sister of Q (e) P is the niece of Q
3. If $P \times R \div Q$, which of the following statement is true?
 (a) P is the uncle of Q (b) P is the father of Q (c) P is the brother of Q
 (d) P is the son of Q (e) None of these
4. If $P \times R - Q$, which of the following is true?
 (a) P is brother-in-law of Q (b) P is the brother of Q (c) P is the uncle of Q
 (d) P is the father of Q (e) None of these
5. If $P + R \div Q$, which of the following is true?
 (a) P is the brother of Q (b) P is the son of Q (c) P is the husband of Q
 (d) P is the father of Q (e) P is the uncle of Q
6. If $P \div R + Q$, which of the following is true?
 (a) P is the father of Q (b) P is the brother of Q (c) P is the mother of Q
 (d) P is the sister of Q (e) None of these

7. If $P \times R \div Q$, which of the following is true?
- (a) P is the uncle of Q (b) P is the father of Q (c) P is brother-in-law of Q
 (d) P is grandfather of Q (e) P is son-in-law of Q
8. If $P - R \times Q$, which of the following is true?
- (a) P is the sister of Q (b) Q is the husband of P (c) P is the sister-in-law of Q
 (d) Q is the sum of P (e) None of these
9. If $A + B$ means A is the mother of B; $A \div B$ means A is the brother of B; $A \times B$ means A is the son of B and $A - B$ means A is the daughter of B, which of the following means C is the niece of D?
- (a) $D - C$ (b) $D \times P - C$ (c) $C - P \div D$ (d) $P + D \div C$ (e) $D - P \div C$
10. If $A + B$ means A is the sister of B, $A - B$ means A is the brother of B, $A \times B$ means A is the daughter of B, which of the following shows the relation that E is the maternal uncle of D?
- (a) $D + F \times E$ (b) $D - F \times E$ (c) $D \times F + E$ (d) $D \times F - E$ (e) None of these

ANSWERS

1. (c) 2. (a) 3. (d) 4. (a) 5. (c) 6. (d) 7. (a) 8. (c) 9. (c) 10. (c)

Explanations

- $P \div R + S + Q$ means P is the daughter of R who is the father of S who is the father of Q i.e. P is the sister of S who is the father of Q i.e. P is the aunt of Q.
- $P - R + Q$ means P is the wife of R who is the father of Q, i.e. P is the mother of Q.
- $P \times R \div Q$ means P is the brother of R who is the daughter of Q, i.e. P is the son of Q.
- $P \times R - Q$ means P is the brother of R who is the wife of Q, i.e. P is the brother-in-law of Q.
- $P + R \div Q$ means P is the father of R who is the daughter of Q, i.e. P is the father of R and Q is the mother of R, i.e. P is the husband of Q.
- $P \div R + Q$ means P is the daughter of R who is the father of Q, i.e., P is the sister of Q.
- $P \times R + Q$ means P is the brother of R who is the father of Q, i.e. P is the uncle of Q.
- $P - R \times Q$ means P is the wife of R who is the brother of Q, i.e. P is the sister-in-law of Q.
- C is the niece of D means C is the daughter of the brother (say P) of D, i.e. $C - P \div D$.
- E is the maternal uncle of D means D is the daughter of the sister (say F) of E, i.e. $D \times F + E$.

Puzzle Test

This chapter includes questions in the form of puzzles involving certain number of items, which may be persons or things. You are required to analyse the given information, condense it in a suitable form and answer the questions asked.

EXAMPLE 1 Read the following information carefully and answer the questions given below:

1. There are five friends—Sonal, Ratheesh, Manoj, Ashok and Gireesh.
 2. Sonal is shorter than Ratheesh but taller than Gireesh.
 3. Manoj is the tallest.
 4. Ashok is a little shorter than Ratheesh and little taller than Sonal.

Questions:

1. Who is the shortest?
(a) Gireesh (b) Sonal (c) Ashok (d) Ratheesh (e) None of these
 2. If they stand in the order of their heights, who will be in the middle?
(a) Ratheesh (b) Gireesh (c) Sonal (d) Ashok (e) None of these
 3. Who is the second tallest?
(a) Sonal (b) Ratheesh (c) Ashok (d) Gireesh (e) None of these
 4. Who is taller than Ashok but shorter than Manoj?
(a) Manoj (b) Ratheesh (c) Gireesh (d) Ashok (e) Sonal
 5. If they stand in the order of increasing heights, who will be the second?
(a) Ashok (b) Sonal (c) Gireesh (d) Ratheesh (e) None of these

Solution Let the friends be denoted by the first letter of each name, namely S, R, M, A and G.

Then $G < S < R$
 $S \leq A \leq R$

Manoj is the tallest.

$$G < S < R$$

$$S \leq A \leq R$$

G < S < A < R < M

1. (a) Gireesh is the shortest.
2. (d) Ashok is in the middle.
3. (b) Ratheesh is the second tallest.
4. (b) Ratheesh is taller than Ashok but shorter than Manoj.
5. (b) In the order of increasing heights, Sonal is in the second position.

EXERCISE 1

Directions (Q. 1 to 5): Read the following information carefully and answer the questions given below:

1. There is a group of six persons A, B, C, D, E and F from a family. They are Professor, Manager, Lawyer, Jeweller, Doctor and Engineer.
2. The Doctor is the grandfather of F who is a Professor.
3. The Manager D is married to A.
4. C, the Jeweller is married to the Lawyer.
5. B is the mother of F and E.
6. There are two married couples in the family.

[Bank PO]

Questions:

1. What is the profession of E?
 (a) Doctor (b) Jeweller (c) Manager (d) Professor (e) None of these
2. How is A related to E?
 (a) Brother (b) Uncle (c) Father (d) Grandfather (e) None of these
3. How many male members are there in the family?
 (a) One (b) Three (c) Four
 (d) Data inadequate (e) Can't be determined
4. What is the profession of A?
 (a) Doctor (b) Lawyer (c) Jeweller (d) Manager (e) None of these
5. Which of the following is one of the pairs of couples in the family?
 (a) AB (b) AC (c) AD
 (d) Can't be determined (e) None of these

Directions (Q. 6 to 10): Study the following information carefully and answer the questions given below it:

Five friends A, B, C, D and E are sitting on a bench.

1. A is sitting next to B.
2. C is sitting next to D.
3. D is not sitting with E.
4. E is on the left end of the bench.
5. C is on second position from the right.
6. A is on the right side of B and to the right side of E.
7. A and C are sitting together.

Questions:

6. Where is A sitting?
 (a) Between B and D (b) Between D and C (c) Between E and D
 (d) Between C and E (e) Between B and C

7. Who is sitting in the centre?
 (a) A (b) B (c) C (d) D (e) E
8. C is sitting between
 (a) B and D (b) A and E (c) D and E
 (d) A and D (e) A and B
9. What is the position of D?
 (a) Extreme left (b) Extreme right (c) Third from left
 (d) Second from left (e) None of these
10. What is the position of B?
 (a) Second from right (b) Centre (c) Extreme left
 (d) Second from left (e) None of these

Directions (Q. 11 to 15): Study the following information carefully and answer the questions given below it: [Bank PO]

A training college has to conduct a refresher course for teachers of seven different subjects—Mechanics, Psychology, Philosophy, Sociology, Economics, Science, and Engineering from 22nd July to 29th July.

1. The course should start with Psychology.
2. 23rd July, being Sunday, should be holiday.
3. Science subject should be on the previous day of the engineering subject.
4. The course should end with Mechanics.
5. Philosophy should be immediately after the holiday.
6. There should be a gap of one day between Economics and Engineering.

Questions:

11. The refresher course will start with which one of the following subjects?
 (a) Psychology (b) Mechanics (c) Philosophy (d) Economics (e) None of these
12. Which subject will be on Tuesday?
 (a) Mechanics (b) Engineering (c) Economics (d) Psychology (e) None of these
13. Which subject precedes Mechanics?
 (a) Economics (b) Engineering (c) Philosophy (d) Psychology (e) None of these
14. How many day's gap is there between Science and Philosophy?
 (a) One (b) Two (c) Three (d) No gap (e) None of these
15. Which subject is followed by Science?
 (a) Engineering (b) Psychology (c) Philosophy (d) Economics (e) None of these

Directions (Q. 16 to 18): Read the following information carefully and answer the questions given below it.

1. Six friends A, B, C, D, E and F are sitting in a closed circle facing the centre.
2. E is to the left of D.
3. C is between A and B.
4. F is between E and A.

Questions:

16. Who is to the left of B?
 (a) A (b) C (c) D (d) E (e) None of these
17. Who is to the right of C?
 (a) A (b) B (c) D (d) E (e) F
18. Which of the above given statements is superfluous?
 (a) 1 (b) 2 (c) 3 (d) 4 (e) None of these

ANSWERS

1. (e) 2. (d) 3. (e) 4. (a) 5. (c) 6. (e) 7. (a) 8. (d) 9. (b) 10. (d)
 11. (a) 12. (c) 13. (e) 14. (a) 15. (d) 16. (c) 17. (a) 18. (e)

Explanations

Given F is a professor, B is the mother of F and E implies that E is a brother or sister of F.

There are only two married couples in the family.

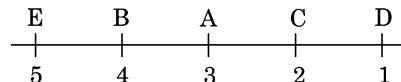
Since D is married to A, C, the jeweller who is married to a lawyer who will be B.

Manager D is married to A means A is the doctor and grandfather of F and E. So E must be an engineer.

1. Here E is an engineer.
So the answer is 'None of these'
2. A is the grandfather of F and E is the brother or sister of F. So A is the grandfather of E.
3. Since nothing is mentioned about E and F, the number of males cannot be determined.
4. A, who is the grandfather of F is doctor.
5. D is the manager married to A. So AD is one of the couples in the family.

Questions 6 to 10

6. A is sitting between B and C.
7. A is sitting in the centre.
8. C is sitting between A and D.
9. D is on the extreme right.
10. B is second from left.

**Questions 11 to 15**

| 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 |
|------------|--------|------------|-----------|---------|-------------|-----------|-----------|
| Psychology | Sunday | Philosophy | Economics | Science | Engineering | Sociology | Mechanics |

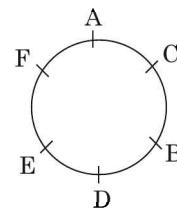
11. The course will start with Psychology.
12. Economics will be on Tuesday.
13. Sociology precedes Mechanics.
14. There is only one day's gap between Science and Philosophy.
15. Economics is followed by Science.

Questions 16 to 18

Seating arrangement is as shown:

16. D is to the left of B.
17. A is to the right of C.
18. Here all statements are necessary to determine the arrangement.

Therefore none of these is superfluous.

**EXERCISE 2**

Examine the following relationships among members of a family of 6 persons A, B, C, D, E, and F.

1. The number of males equals that of females.
2. A and E are sons of F.

7. In a group of six women, there are four dancers, four vocal musicians, one actress and three violinists. Girija and Vanaja are among the violinists while Jalaja and Shailaja do not know how to play the violin. Shailaja and Thanuja are among the dancers, Jalaja, Vanaja, Shailaja and Thanuja are all vocal musicians and two of them are also violinists. If Pooja is an actress, who among the following is both a dancer and a violinist? [IAS]

(a) Jalaja (b) Shailaja (c) Thanuja (d) Pooja

8. In a group of six women there are four table tennis players, four postgraduates in economics, one postgraduate in commerce and three bank employees. Vimala and Kamala are among the bank employees while Amala and Komala are unemployed. Komala and Nirmala are among the table tennis players. Amala, Kamala, Komala and Nirmala are postgraduates in economics of whom two are bank employees. If Shyamala is a postgraduate in commerce who among the following is both a table tennis player and a bank employee? [IAS]

(a) Nirmala (b) Vimala (c) Amala (d) Komala

9. A is seated between D and F at a round table. C and not E is seated opposite to D. Who sits opposite to B? [IAS]

(a) A (b) D (c) C (d) F

10. There are 5 bus stops A, B, C, D, and E at equal intervals. C is not the middle stop. A and E are not terminal stops. C comes twice as many stops before D in upward journey as B comes after A. D is the first stop in the downward journey. Give the correct sequence of the stops in the downward journey [IAS]

(a) DEACB (b) DAECB (c) DACEB (d) DCBAE

11. In a group of 5 people, K, L, and M are ambitious. M, N, and R are honest, L, M, and N are intelligent and K, N, and R are industrious. Among these, neither industrious nor ambitious persons would include [IAS]

(a) K alone (b) L and R (c) M and N (d) None in the group

12. Six roads lead to a country. They may be indicated by letters X, Y, Z, and digits 1, 2, 3. When there is storm, Y is blocked. When there are floods X, 1 and 2 will be affected. When road 1 is blocked, Z is also blocked. At a time when there are floods and a storm also blows, which road(s) can be used? [IAS]

(a) Z and 2 (b) Only Z (c) Only 3 (d) Only Y

13. A truck, a car and a motor cycle have equal kinetic energies. If equal stopping forces are applied and they stop after travelling a distance of X, Y, and Z respectively, then [IAS]

(a) $X > Y > Z$ (b) $X < Y < Z$ (c) $X = Y = Z$ (d) $X = 4Y = 8Z$

14. Seven men A, B, C, D, E, F and G are standing in a queue in that order. Each one is wearing a cap of a different colour like violet, indigo, blue, green, yellow, orange and red, D is able to see in front of him green and blue, but not violet. E can see violet and yellow, but not red. G can see caps of all colours other than orange. If E is wearing an indigo coloured cap, then the colour of the cap worn by F is [IAS]

(a) Blue (b) Violet (c) Red (d) Orange

In a group of 5 persons A, B, C, D, and E, there is a professor, a businessman and an artist. A and D are ladies who are unmarried and do not work. Of the married couple in the group E is the husband. B is the brother of A and is neither a businessman nor an artist. E's wife is an artist.

15. Who is the professor?

(a) A (b) B (c) C (d) D

16. Who is the artist?

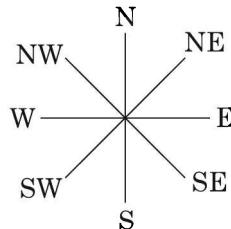
(a) A (b) B (c) C (d) E

ANSWERS

- 1.** (b) **2.** (d) **3.** (b) **4.** (d) **5.** (a) **6.** (c) **7.** (c) **8.** (a) **9.** (a) **10.** (a)
11. (d) **12.** (c) **13.** (a) **14.** (c) **15.** (b) **16.** (d) **17.** (c) **18.** (a) **19.** (d) **20.** (b)
21. (c) **22.** (b) **23.** (d) **24.** (b) **25.** (a)

Direction Sense Test

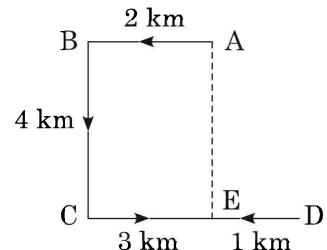
In this test, questions consist of a sort of direction puzzle. A successive follow-up of directions is formulated and the candidate is required to ascertain the final direction or the distance between two points. The test is meant to judge the candidate's ability to trace and follow correctly and sense the direction correctly.



EXAMPLE 1 Ravi walked 2 km west of his house and then turned south covering 4 km. Finally, he moved 3 km towards east and then again 1 km west. How far is he from his initial position?

- (a) 2 km (b) 4 km (c) 9 km (d) 10 km

Solution Ravi started from his house at A, moves 2 km west up to B, 4 km towards south up to C, 3 km east up to D and finally 1 km west up to E. Thus, his distance from the initial position A = AE = BC = 4 km. Hence the answer is (b).



EXAMPLE 2 A man walks 6 km to the east and then turns to the south and walks 5 km. Again he turns to the east and walks 6 km. Next, he turns towards north and walks 10 km. How far is he now from his starting point?

- (a) 5 km (b) 12 km (c) 13 km (d) 17 km (e) 11 km

Solution The man starts from the point A and walks 6 km, 5 km, 6 km and 10 km respectively towards east, south, east and north respectively.

Draw $BO \perp DE$

$$\text{Now } BO = CD = 6 \text{ km}$$

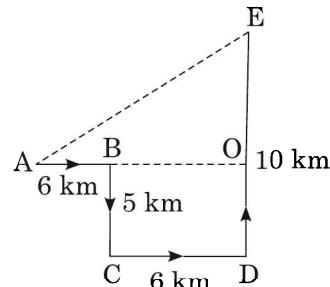
$$\therefore AO = AB + BO = 6 + 6 = 12 \text{ km}$$

$$OE = DE - DO = 10 - 5 = 5 \text{ km}$$

\therefore Man's distance from his starting point

$$AE = \sqrt{AO^2 + OE^2} + \sqrt{12^2 + 5^2} = \sqrt{169} = 13 \text{ km}$$

Hence the answer is (c).



EXAMPLE 3 Arun moved a distance of 75 metres towards north. He then turned to the left and walked for about 25 metres, turned left again and walked 80 metres. Finally he turned to the right at an angle of 45° . In which direction was he moving finally?

- (a) North-east (b) North-west (c) South
- (d) South-east (e) South-west

Solution Arun started from A, moved 75 m towards north up to B, turned left and walked 25 m up to C. He then turned left again and moved 80 m up to D. Turning to the right at an angle of 45° , she was finally moving in the direction DE, i.e. south-west. Hence, the answer is (e).

EXAMPLE 4 Satheesh left for his office in his car. He drove 15 km towards north and then 10 km towards west. He then turned to the south and covered 5 km. Further, he turned to the east and moved 8 km. Finally, he turned right and drove 10 km. How far and in which direction is he from his starting point?

- (a) 2 km west (b) 5 km east (c) 3 km north
- (d) 6 km south (e) None of these

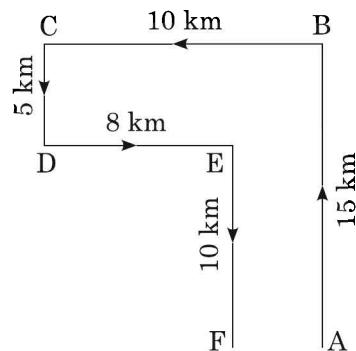
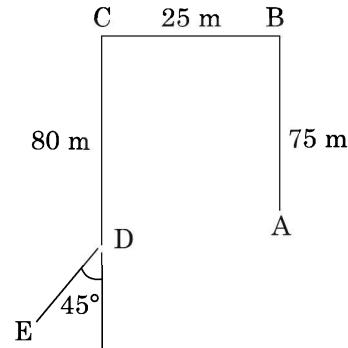
Solution Satheesh started from A towards B and moved a distance of 15 km and 10 km from B to C towards west. He then moved from C to D, 5 km towards south and 8 km towards E. Finally he turned right and moved a distance of 10 km up to F.

Now F and A are in the same straight line and F lies to the west of A.

\therefore Distance from starting point A

$$= AF = BC - DE = 10 - 8 = 2 \text{ km}$$

Hence, the answer is (a).



1. Kishore walks 10 km towards north. Then he walked 6 km towards south. Then he walks 3 km towards east. How far and in which direction is he with reference to his starting point?
- (a) 7 km east (b) 5 km west (c) 5 km north east (d) 7 km west

EXERCISE 1

ANSWERS

1. (c) 2. (b) 3. (a) 4. (b) 5. (e) 6. (b) 7. (c) 8. (a) 9. (e) 10. (d)

Explanations

1. The movements of Kishore are shown in the adjoining figure.

(A → B → C → D)

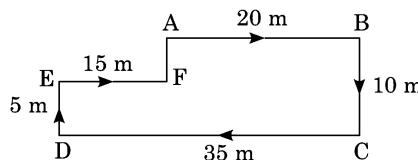
$$AC = AB - BC = 10 - 6 = 4 \text{ km}$$

$$CD = 3 \text{ km}$$

$$\therefore AD = \sqrt{AC^2 + CD^2} = \sqrt{4^2 + 3^2} = 5 \text{ km}$$

So, Kishore is 5 km north-east.

2. Movements of man shown in the adjoining figure.



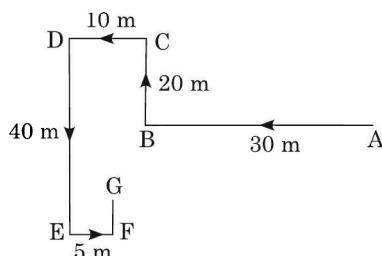
Here, DC = AB + EF

∴ F is in a line with A.

$$AF = BC - ED = 10 - 5 = 5 \text{ m}$$

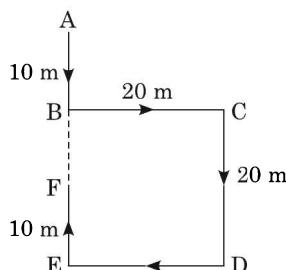
∴ The man is 5 metres away from his initial position.

3. The movements of James are shown in the adjoining figure from A to G.



James is walking in the direction FG, i.e. towards north.

4. The movement of Sudheesh are shown in the adjoining figure.

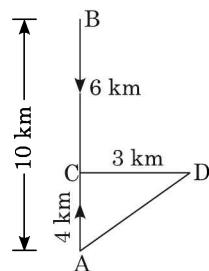


Distance from initial position of Sudheesh to final position

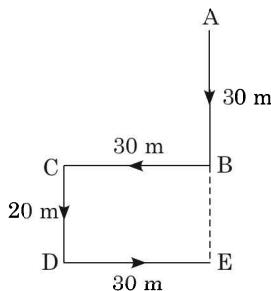
$$\begin{aligned} AF &= AB + BF \\ &= AB + (BE - FE) \\ &= 10 + (20 - 10) \\ &= 20 \text{ m} \end{aligned}$$

F lies in the south of A.

∴ 20 m south is the final position of Sudheesh from the starting point.

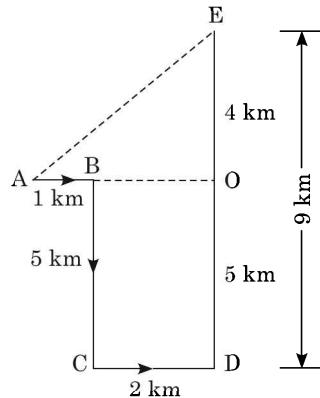


5. The movements of man are shown in the adjoining figure.



\therefore Man's distance from the initial position = AE = AB + BE
 $= AB + CD = 30 + 20 = 50 \text{ m.}$

6. The movements of Gopal are shown in the adjoining figure.

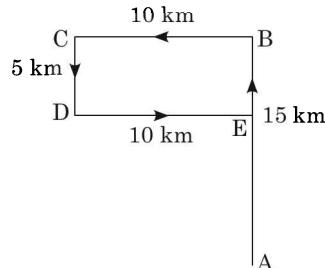


$$\begin{aligned}BO &\perp DE \\BO &= CD = 2 \text{ km} \\AO &= AB + BO = 1 + 2 = 3 \text{ km} \\OE &= DE - DO = DE - BC \\&= 9 - 5 = 4 \text{ km}\end{aligned}$$

\therefore Distance of Gopal from starting point A.

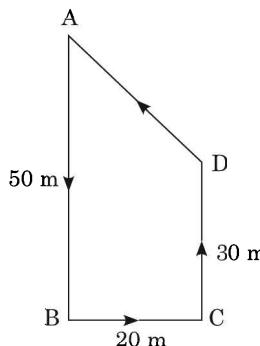
$$= AE = \sqrt{AO^2 + OE^2} = \sqrt{3^2 + 4^2} = 5 \text{ km}$$

7. The movements of Sumesh are shown in the adjoining figure.



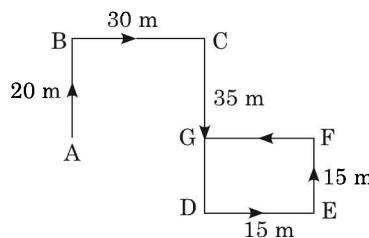
The final position E is north of Sumesh's house at A.

8. The movements of Lakshmi are shown in the adjoining figure.



She is moving in the direction DA towards her house.
i.e. north-west.

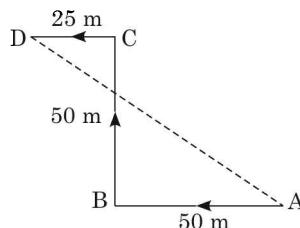
9. The movements of Dinesh are shown in the adjoining figure.



He is moving from A to G.

∴ Distance of Dinesh from initial position = AG = BC = **30 m east**.

10. The movements of Anil are shown in the adjoining figure.



He starts walking from back of his house, i.e. towards west.

Now, the final position is D, which is to the north west of his starting point A.

EXERCISE 2

- Binoj's school bus is facing north when it reaches his school. After starting from Binoj's house, it turns right twice and then left before reaching the school. What direction was the bus facing when it left the bus stop in front of Binoj's house. **[Bank PO]**
 - South
 - North
 - East
 - West
 - None of these
- A, B, C, and D are playing cards. A and B are partners. D faces towards north. If A faces west, then who faces south? **[AO Exam]**
 - C
 - B
 - D
 - Data inadequate
 - None of these

3. There are four persons P, Q, R and T. Q is to the south-west of P; R is to the east of Q and south-east of P, and T is to the north of R in line with QP. In which direction of P is T located?
 (a) South-east (b) North (c) North-east (d) East
4. A and B start moving towards each other from two places 200 m apart. After walking 60 m, B turns left and goes 20 m, then he turns right and goes 40 m. He then turns right again and comes back to the road on which he had started walking. If A and B walk with the same speed, what is the distance between them now?
 (a) 50 m (b) 40 m (c) 30 m (d) 20 m
5. Two ladies and two men are playing cards and are seated at north, east, south and west of a table. No lady is facing east. The persons sitting opposite to each other are not of the same sex. One man is facing south. Which directions are the ladies facing?

[RBI Officer's Exam]

- (a) East and west (b) South and east (c) North and east
 (d) North and west (e) None of these
6. One morning after sunrise, Vishakh and Satheesh were standing in a lawn with their backs towards each other. Vishakh's shadow fell exactly towards left hand side. Which direction was Satheesh facing?
 [BSRB Exam]

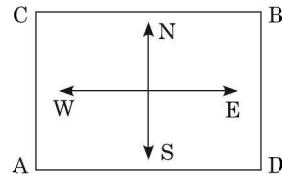
(a) East (b) West (c) North (d) South

7. The post office is to the east of the school while my house is to the south of the school. The market is to the north of the post office. If the distance of the market from the post office is equal to the distance of my house from the school, in which direction is the market with respect to my school?
 [AAO Exam]

(a) North (b) East (c) North-east (d) South-west

8. From the positions in original figure, A and C move diagonally to opposite corners and then one side each clockwise and anticlockwise respectively. D and B move two sides each clockwise and anticlockwise respectively. Where is A now?

(a) At the north-west corner
 (b) At the north-east corner
 (c) At the south-east corner
 (d) At the south-west corner
 (e) Midway between original position of B and D.



9. From the original position given in the above figure, A and B move one arm length clockwise and then cross over to the corner diagonally opposite, C and D move one arm length anticlockwise and cross over the corner diagonally opposite. The original configuration ABCD has now changed to

(a) CBDA (b) BDAC (c) DACB (d) ACBD (e) BCAD

10. Facing the east, Rajesh turned left and walked 10 m, then turned to his left again and walked 10 m. He then turned 45° towards his right and went straight to cover 25 m. In which direction from his starting point is he?

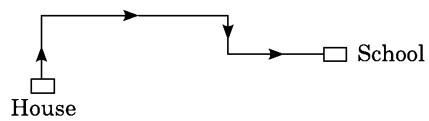
(a) South-west (b) South-east (c) North-west (d) North-east (e) East

ANSWERS

1. (d) 2. (a) 3. (c) 4. (b) 5. (d) 6. (d) 7. (c) 8. (c) 9. (c) 10. (d)

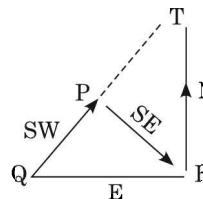
Explanations

1. In the given diagram, the route of the bus from Binoj's house to the school is shown. As the bus faces north on reaching the school, from the diagram, it faces west in front of Binoj's house.

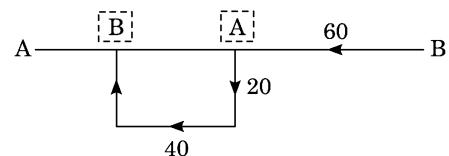


2. As per the data, D faces north. A faces towards west. So, its partner B will face towards A and hence towards east. So, C who will face D will face south.

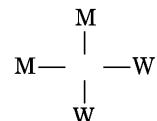
3. Clearly, the arrangement according to the given directions is as shown. So, comparing the direction diagram, T is north east of P.



4. If both A and B move with the same speed, they will travel the same distance $= 60 + 20 + 40 + 20 = 140$ m in the same time. So, A will travel 140 m in the horizontal direction. B travels 100 m horizontally. So distance between A and B will now be the difference $= 140 - 100 = 40$ m.

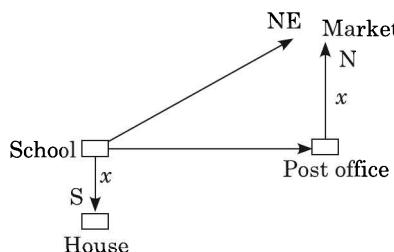


5. No lady is facing east means a man faces east. The persons opposite are not of same sex. So a woman will be facing west. Again a man faces south. So a woman will be facing north.



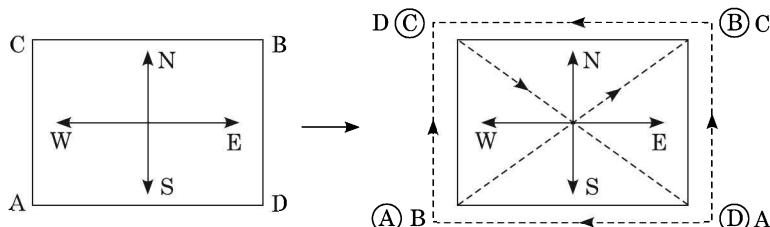
6. Since Vishakh's shadow falls towards left, therefore, Vishakh is facing north. So Satheesh with his back towards Vishakh, will be facing south.

7. Distance of house from school = x
= Distance of market from post office

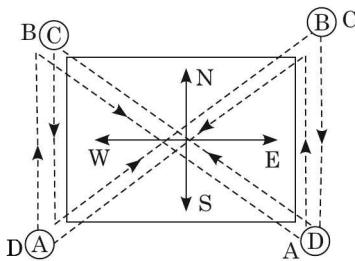


So, direction of market school with respect to school = North-east

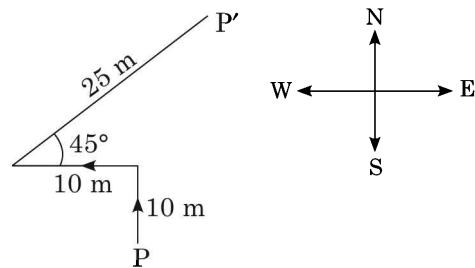
8. A is now at south-east corner.



9. ADBC is changed to DACB.



10. P' is North-east of P



Logical Venn Diagrams

This chapter deals with questions which aim at analysing a candidate's ability to relate a certain given group of items and illustrate it diagrammatically.

Certain types of Venn diagrams are given with its implication.

1. If *three* items are given belonging to three different groups, the same can be represented using Venn diagram as shown in Figure 7.1.

For example: Doctors, engineers, lawyers.

The above three bear no relationship with each other. So they are represented by 3 disjoint figures.

2. If *one* item belongs to the class of second and the second belongs to the class of third, then these items can be represented as three concentric circles as shown in Figure 7.2.

For example: Seconds, minutes, hours.

Here, seconds are part of minute and minutes are part of hours. So the Venn diagram would be as shown in Figure 7.2 with circle A representing seconds, B representing minutes and C representing hours.

3. If *two* separate items belong to the class of the third, they are represented by two disjoint circles inside a bigger circle as shown in Figure 7.3.

For example: Table, chair, furniture.

Here, table and chair are separate items both belonging to the class of furniture. So they would be represented as two disjoint circles A and B respectively representing table and chair within a circle C representing furniture.

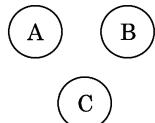


Figure 7.1

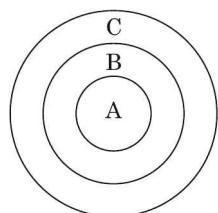


Figure 7.2

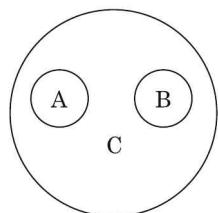


Figure 7.3

4. If *two* items belong to the class of third such that some items of each of these two groups are common in relationship, then they are represented by two intersecting circles enclosed within a bigger circle as shown in Figure 7.4.

For example: Males, Fathers, Brothers.

Here, some fathers may be brothers. So, fathers and brothers would be represented by two intersecting circles A and B. Also, both fathers and brothers are males. The bigger circle C represents males.

5. If *two* items are partly related to the third, and are themselves independent of each other they are represented by three intersecting circles in a line as shown in Figure 7.5.

For example: Dogs, Pets, Cats.

Here, some dogs and some cats are pets. But all the pets are not dogs or cats. Dogs and cats are not related to each other. So the given three items can be represented using three circles A, B, and C representing dogs, pets and cats respectively as shown in Figure 7.5.

6. If *three* items are partly related to each other, they are represented as shown in Figure 7.6.

For example: Clerks, Government employees, Educated persons.

Here, some clerks may be government employees and some may be educated. Similarly, some government employees may be clerks and some may be educated. Also, some educated persons may be clerks and some may be government employees.

7. If *one* item belongs to the class of second while the third item is entirely different from the two, then they may be represented by Figure 7.7.

For example: Engineers, Human beings, Rats.

Here, all engineers are human beings. This would be represented by two concentric circles. But the class of rats is entirely different from these two. In Figure 7.7, circle A represents engineers, circle B represents human beings and circle C represents rats.

8. If *one* item belongs to the class of second and the third item is partly related to these two, they can be represented as in Figure 7.8.

For example: Females, Mothers, Doctors.

All mothers are females. This would be represented by two concentric circles. But some females and some mothers can be doctors. So the circle representing doctors would intersect the two concentric circles. Thus in Figure 7.8, circle A represents mothers, circle B represents females and circle C represents doctors.

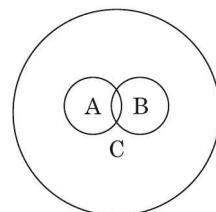


Figure 7.4

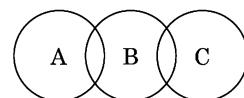


Figure 7.5

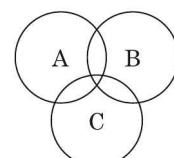


Figure 7.6

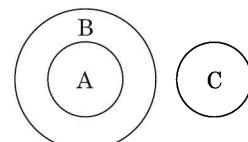


Figure 7.7

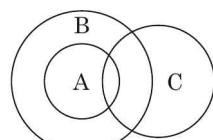


Figure 7.8

9. If one item belongs to the class of second and the third item is partly related to the second, they can be represented as in Figure 7.9.

For example: Grass-eating animals, cows, flesh eating animals.

Here, cows are grass-eating animals. So, they would be represented by two concentric circles. But some grass-eating animals are flesh-eating also. Thus the Venn diagram can be represented as in Figure 7.9 with circle A representing cows, circle B representing grass-eating animals and circle C representing flesh eating animals.

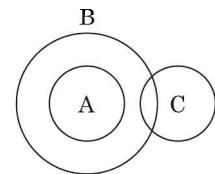
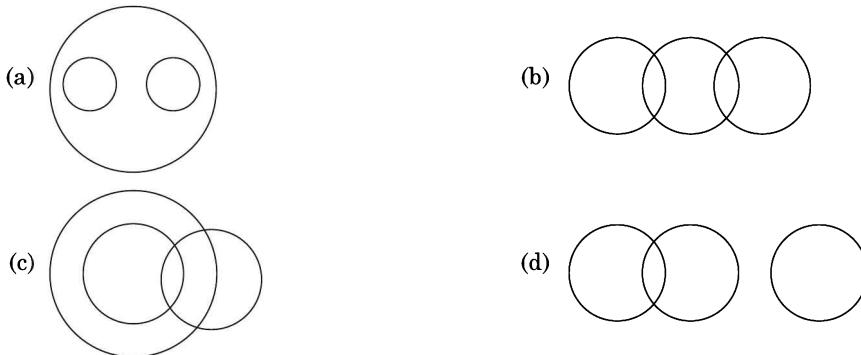


Figure 7.9

EXERCISES

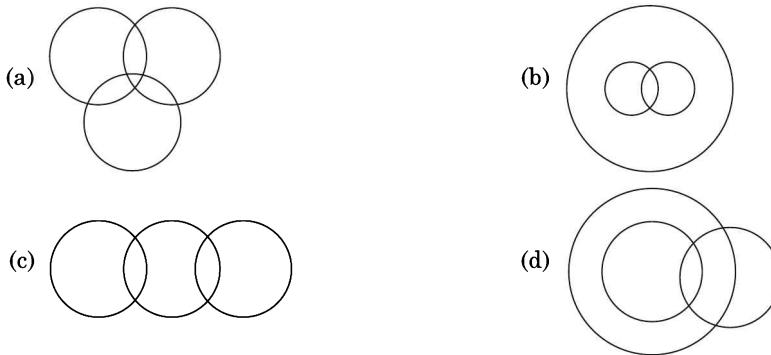
1. Which of the following diagrams correctly represents elephants, wolves, animals?

[IAS]



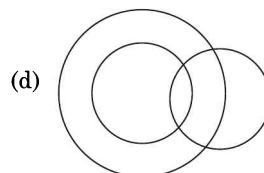
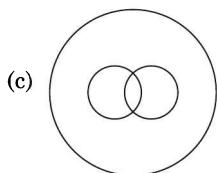
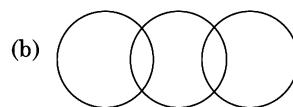
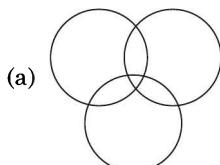
2. Which one of the following diagrams correctly represents the relationship among tennis fans, cricket players and students?

[IAS]

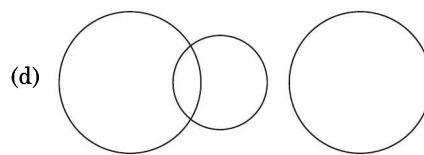
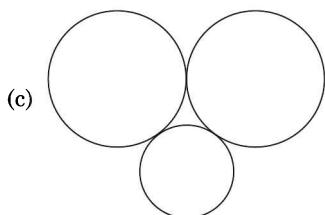
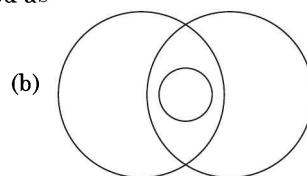
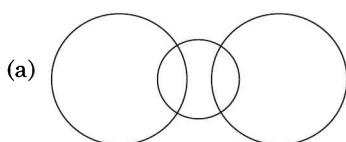


3. Which is the most suitable Venn diagram among the following, which represents interrelationship among anti-social elements, pickpockets and blackmailers?

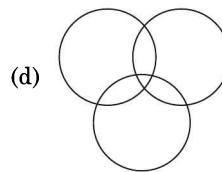
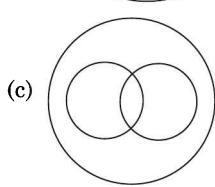
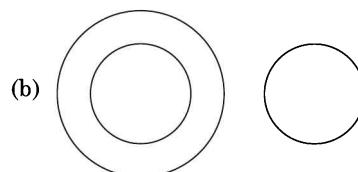
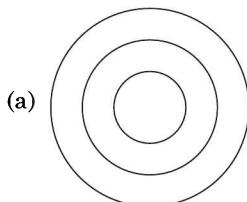
[IAS]



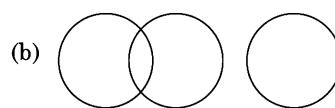
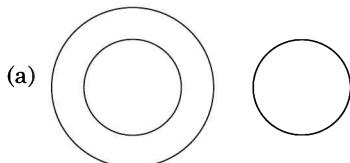
4. If animals that live on land and the animals that live in water are represented by two big circles and animals that live in water and on land are represented by small circle, the combination of these three can be represented as [IAS]

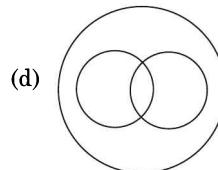
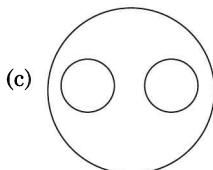


5. Which of the following gives the proper relation of tall men, black haired people, Indians? [IAS]



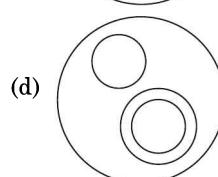
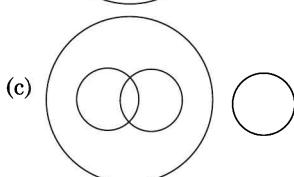
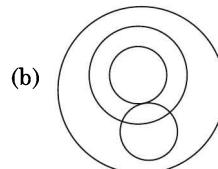
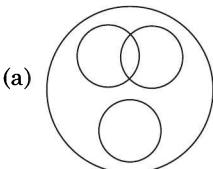
6. Choose from the four diagrams given below, the one that illustrates the relationship among languages, French, German.





7. In a dinner party both fish and meat were served. Some took only fish and some only meat. There were some vegetarians who did not accept either. The rest accepted both fish and meat. Which one of the following logic diagrams correctly reflects the above situation?

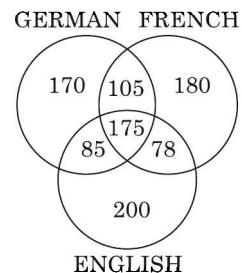
[IAS]



8. A survey was conducted on a sample of 1,000 persons with reference to their knowledge of English, French and German. The results of the survey are presented in the given Venn diagram. The ratio of the number of the persons who do not know any of the three languages to those who know all the three languages is

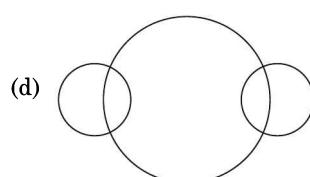
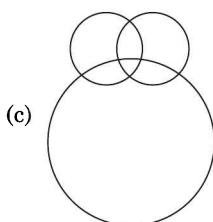
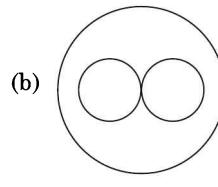
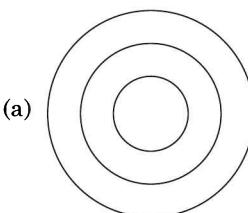
[IAS]

- (a) $1/27$
 (b) $1/25$
 (c) $1/550$
 (d) $175/1000$



9. Which one of the following Venn diagrams correctly illustrates the relationship among the classes: carrot, food, vegetable?

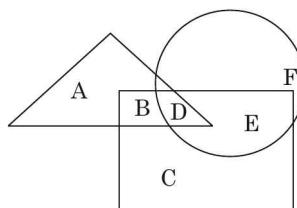
[IAS]



10. In the given figure, the triangle represents girls, the square represents sports persons and the circle represents coaches. The portion in the figure which represents girls who are sports persons but not coaches is the one labelled. [IASI]

- (a) A
- (c) D

- (b) B
- (d) E



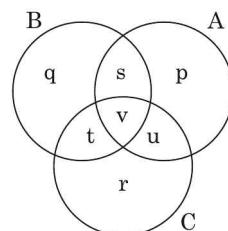
11. In the given diagram, circle A represents teachers who can teach Physics, circle B represents teachers who can teach Chemistry and circle C represents those who can teach Mathematics. Among the regions marked p, q, r ... the one which represents teachers who can teach Physics and Mathematics but not Chemistry is [IAS]

(a) v (b) u
(c) s (d) t

(a) v
(c) s

(b) u
(d) t

12. Which one of the following four logical diagrams represent correctly the relationship between Musicians, Instrumentalists, Violinists? [IAS]



(a)

A diagram consisting of three concentric circles, drawn with thin black lines, centered in the middle of the page. The circles represent a target or a goal.

(b)

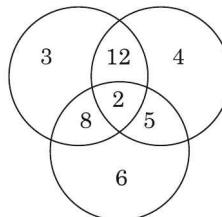
A Venn diagram consisting of three circles. The first circle is at the bottom left, the second is at the top left, and the third is at the top right. All three circles overlap with each other.

60

61

A diagram consisting of two concentric circles. A horizontal line segment connects the centers of the two circles.

13. Consider the Venn diagram given below.



The numbers in the Venn diagram indicated are persons reading the newspapers. The diagram is drawn after surveying 50 persons. In a population of 10,000 how many can be expected to read at least two newspapers? Choose the correct answer from the following: [IAS]

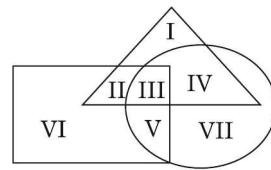
(a) 5000

(b) 6250

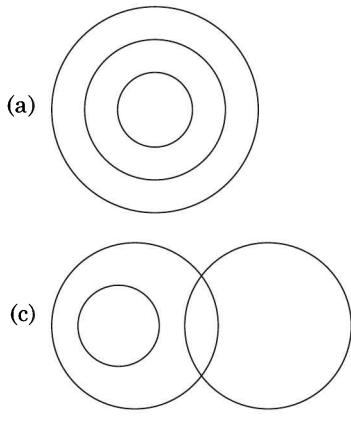
(c) 6000

(d) 5400

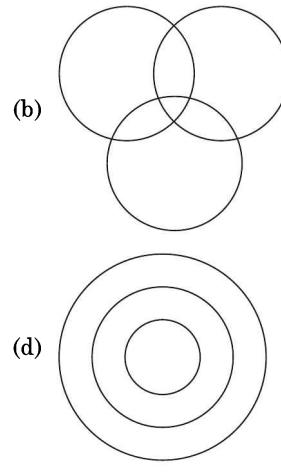
14. The triangle, square and circle shown below respectively represent the urban, hard working and educated people. Which one of the areas marked I-VII is represented by the urban educated who are not hardworking? [IAS]



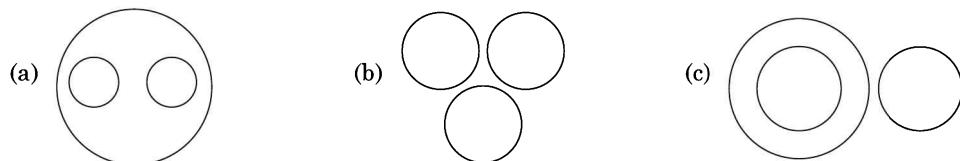
15. Which one of the following Venn diagrams best illustrates the three classes: rhombus, quadrilaterals and polygons?

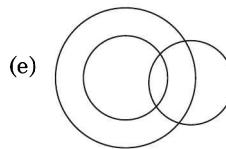
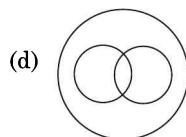


16. Select from the four alternative diagrams, the one that best illustrates the relationship among the three classes: pigeons, birds, dogs.



In each of the following questions, choose the Venn diagram which best illustrates the relationship among three given circles.





17. Diseases, leprosy, scurvy
18. Hockey, cricket, games
19. Yak, zebra, bear
20. Sun, moon, stars
21. Animals, men, plants
22. Mercury, mars, planets

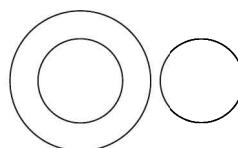
**Choose the Venn diagram which best illustrates the three given classes in each question.
Mark your answer as (a), (b), (c) or (d).**

23. Protons, electrons, atoms
24. Sun, planets, earth
25. Dog, animal, pet
26. Science, physics, chemistry
27. Atmosphere, hydrogen, oxygen
28. Wheat, grains, maize
29. Machine, lathe, mathematics
30. Biology, botany, zoology

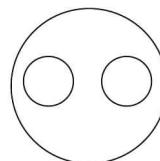
[CBI]

[Railways]

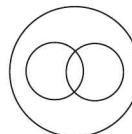
- (a) Indicates that one class is completely contained in the other but not the third.



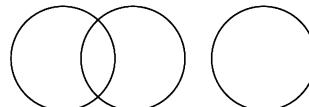
- (b) Indicates that two classes are completely contained in the third.



- (c) Indicates that neither class is completely contained in the other but the two have common members, forming one entity.



- (d) Indicates that two classes are inter-related and third one is not.

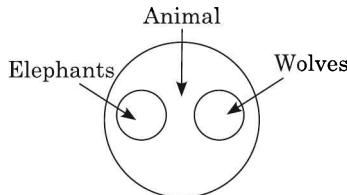


ANSWERS

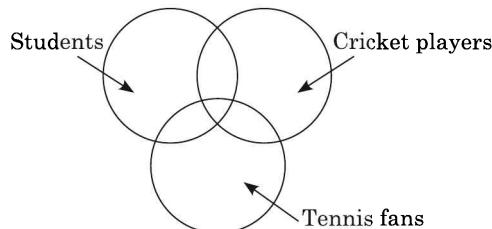
1. (a) 2. (a) 3. (c) 4. (a) 5. (d) 6. (c) 7. (c) 8. (b) 9. (a) 10. (b)
 11. (b) 12. (d) 13. (d) 14. (c) 15. (a) 16. (a) 17. (a) 18. (a) 19. (b) 20. (c)
 21. (c) 22. (a) 23. (b) 24. (a) 25. (c) 26. (b) 27. (b) 28. (b) 29. (a) 30. (b)

Explanations

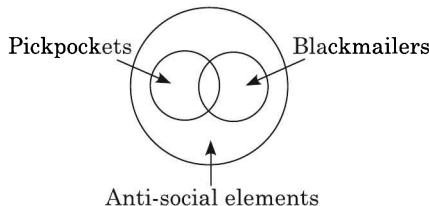
1. Elephants and wolves bear no relationship to each other. But, both of them are animals.



2. Some students can be cricket players. Some cricket players can be tennis fans. Some students can be tennis fans. So, the given items are partly related to each other.

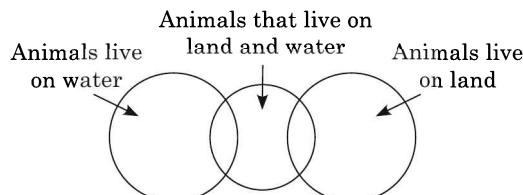


3. Both pickpockets and blackmailers are antisocial elements. But, some pickpockets can be blackmailers and vice versa.

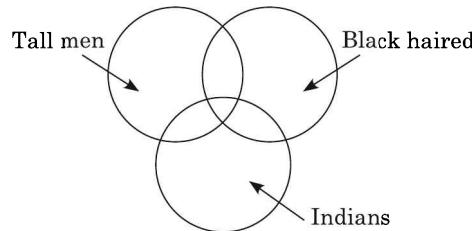


4. Here three classes are given. Two classes are not having any common characteristics. One class is having some common characteristic with the other two.

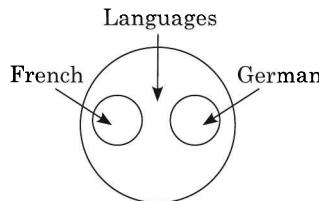
That is, 'Animals live on both land and water' is having common characteristic with the classes 'Animals live on land' and 'Animals live on water'.



5. Some tall men can be black haired. Some black haired persons can be Indians. Some tall men can be Indians. So, all the three are partly interrelated.

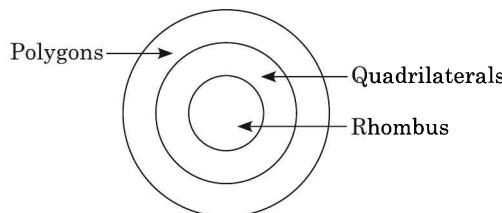


6. Both French and German are languages. But both of them are different from each other.

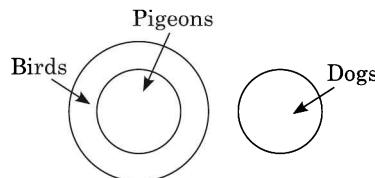


$$8. \text{ Required ratio} = \frac{7}{175} = \frac{1}{25}$$

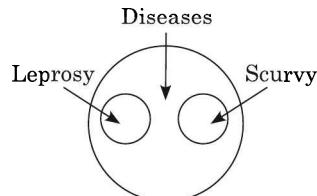
12. In the given three classes Musicians, Instrumentalists and Violinists,—Violinists come under the class of Instrumentalists. Musicians are different from two classes. Sometimes a musician may also be an Instrumentalist. But from the available choices only (d) is the most appropriate one.
15. All rhombus are quadrilaterals. All quadrilaterals are polygons.



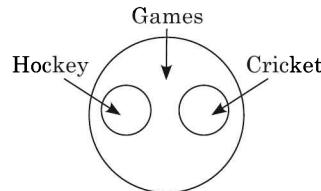
16. All pigeons are birds. But, dogs are entirely different.



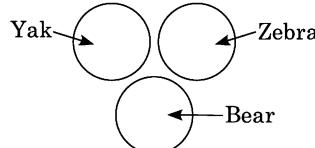
17. Both leprosy and scurvy are diseases. But, both are entirely different from each other.



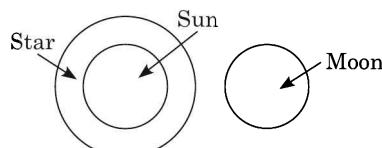
18. Both hockey and cricket are games. But, both are entirely different from each other.



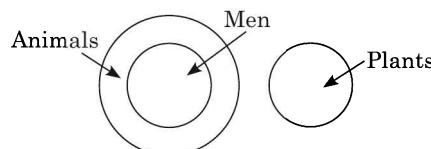
19. Yak, zebra and bear are all different from each other.



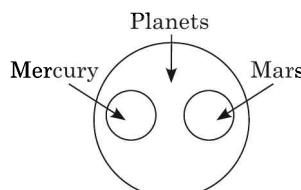
20. Sun is a star, moon is entirely different from the two.



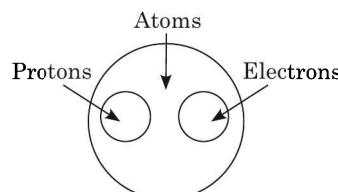
21. Men belongs to the class of animals. Plants are entirely different from the two.



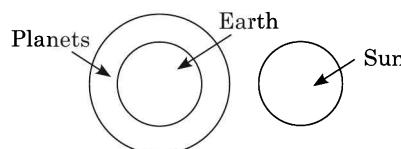
22. Mercury and mars are entirely different from each other. But both are planets.



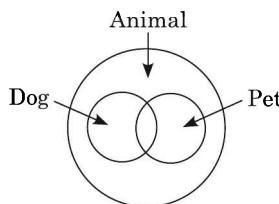
23. Protons and electrons are entirely different from each other. But, both are parts of atoms.



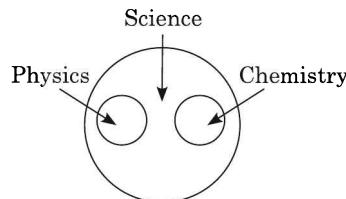
24. The earth belongs to the class of planets. But, sun is entirely different from the two.



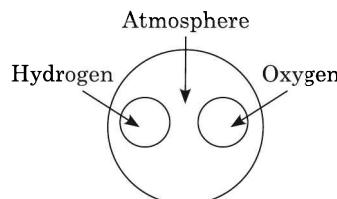
25. Some dogs are pets and some pets are dogs. Both dog and pet are animals.



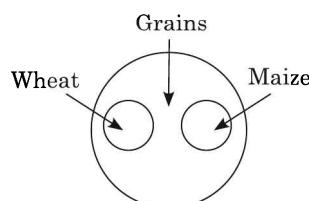
26. Physics and chemistry are entirely different from each other. But, both belong to the class of science.



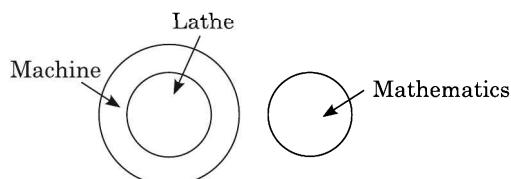
27. Hydrogen and oxygen are entirely different from each other. But, both are parts of atmosphere.



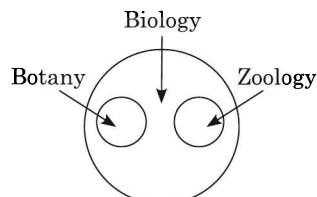
28. Wheat and maize are two different items. But, both belong to the class of grains.



29. Lathe is a type of machine. But, Mathematics is entirely different from the two.



30. Botany and zoology are entirely different from each other. But, both are branches of biology.



Number Ranking and Time Sequence Test

NUMBER TEST: In the number test, you are given a series of numbers. You have to find out how many times a number satisfying the conditions specified in the question occurs.

EXAMPLE 1 How many 7s immediately preceded by 6 but not immediately followed by 4 are there in the following series? [AO Exam]

7 4 2 7 6 4 3 6 7 5 3 5 7 8 4 3 7 6 7 2 4 0 6 7 4 3

- (a) 1 (b) 2 (c) 4 (d) 6 (e) None of these

Solution Clearly, the numbers satisfying the given conditions can be shown as follows:

7 4 2 7 6 4 3 6 7 5 3 5 7 8 4 3 7 6 7 2 4 0 6 7 4 3

Here there are two such 7s in the number series which is preceded by 6 and not followed by 4. Therefore the answer is (b).

EXAMPLE 2 How many 1s are there in the following sequence which are immediately preceded by 9 but not immediately followed by 7? [Bank PO]

7 1 9 1 1 7 1 8 9 1 7 1 2 1 3 1 4 5 7 1 3 9 1 7

- (a) One (b) Two (c) Three (d) Four (e) None of these

Solution The answer is (a).

EXAMPLE 3 In the following series of numbers, how many times have the figures 9, 1 and 8 appeared together, 1 being in the middle and 9 and 8 being on either side of 1?

[RRB Exam]

2 1 9 8 1 9 8 3 7 1 9 7 8 1 2 9 1 9 8 1 8 2 1 2

- (a) One (b) Six (c) Three (d) Four (e) None of these

Solution There is only one digit between 9 and 8. Therefore, the answer is (a).

RANKING TEST: In the ranking test, generally the ranks of a person both from the top and from the bottom are mentioned and the total number of persons is asked. However, sometimes the question is put in the form of a puzzle of interchanging seats by two persons.

EXAMPLE 4 Sajith ranked thirteenth from the top and twenty sixth from the bottom among those who have passed in the annual examination in a class. If six students have failed in the annual examination, what was the total number of students in that class?

[Bank PO]

- (a) 38 (b) 44 (c) 45 (d) 50 (e) None of these

Solution Number of students passed = $(12 + 1 + 25) = 38$

Number of students failed = 6

$$\therefore \text{Total number of students} = 38 + 6 = 44$$

EXAMPLE 5 Sanal's position in a row is 12th from the front side and 7th from the back side. How many persons are standing in that row? [Railway Recruitment]

- (a) 17 (b) 18 (c) 19 (d) 20 (e) 21

Solution Number of persons in the row = $11 + 6 + 1 = 18$

TIME SEQUENCE TEST: In the time sequence test, you will be asked to find a day which falls between two pair of dates. From that you have to locate the exact day.

EXAMPLE 6 The Managing Director entered the conference room ten minutes before 12.30 hours for interviewing. He came 20 minutes before the chairman who was 30 minutes late. At what time, the interviews were scheduled? [AO Exam]

- (a) 12.50 (b) 12.40 (c) 12.20 (d) 12.10 (e) 12.00 Noon

Solution The Managing Director came at 12.20. Thus chairman came at 12.40. Since the chairman was late by 30 minutes, interviews were scheduled to be held at 12.10. The answer is (c).

EXERCISES

1. How many 8s are there in the following number sequence which are preceded by 7 but not immediately followed by 4? [SBI PO]

2 3 8 2 5 7 8 3 7 8 4 6 9 8 4 3 2 7 8 9 5 7 8 1 5 2 9

- (a) One (b) Two (c) Three (d) Four (e) None of these

2. How many 3s are there in the following number sequence which are immediately preceded by 6 but not immediately followed by 7? [Bank PO]

2 3 7 4 3 5 6 3 7 4 6 3 8 9 6 3 5 1 8 3 7 2 4 2 8 6 3 9

- (a) One (b) Two (c) Three (d) Four (e) More than four

3. How many numbers from 11 to 50 are there which are exactly divisible by 7 but not by 3? [Bank PO]

- (a) Two (b) Four (c) Five (d) Six (e) Seven

4. How many numbers from 1 to 100 are there each of which is not only exactly divisible by 4 but also has 4 as a digit? [SBI PO]

- (a) 7 (b) 10 (c) 20 (d) 21 (e) More than 21

5. Abhishek ranks thirteenth in a class of thirty one. What is his rank from the last?

[RBI Exam]

- (a) 15th (b) 17th (c) 19th (d) 20th (e) None of these

6. In a row of girls, if Savitha who is tenth from the left and Anita who is ninth from the right interchange their places, Savitha becomes fifteenth from the left. How many girls are there in the row?

[Bank PO]

- (a) 16 (b) 18 (c) 19 (d) 22 (e) None of these

7. How many days will there be from 26th January, 1988 to 15th May, 1988 (both days included)?

[Railway Recruitment]

- (a) 110 (b) 111 (c) 112 (d) 113 (e) None of these

8. Ram remembers that Lakshman's birthday is after 19th but before 22nd November, whereas Anil remembers that Lakshman's birthday is after 20th but before 24th November. Which day is Lakshman's birthday?

- (a) 20th November (b) 21st November (c) 22nd November
 (d) 23rd November (e) None of these

9. In the series given below, count each 5 which is not immediately preceded by 3 but is immediately followed by 7. How many such 5s are there?

1 5 7 3 5 7 4 7 3 7 2 5 6 5 8 5 7 4 5 6 5 5 7 1 5 7 7 5 5

- (a) 1 (b) 2 (c) 3 (d) 4 (e) 5

10. Below is given a number series

1 8 5 7 2 9 8 4 3 6 2 7 5 1 8 9 4 3 6 5 9

How many instances are there in which an even number is followed by two odd numbers?

- (a) Nil (b) One (c) Two (d) Three (e) None of these

11. A number is greater than 3 but less than 8. Also, it is greater than 6 but less than 10. The number is _____.

- (a) 5 (b) 6 (c) 7 (d) 8 (e) 9

12. $16 \times 85 = 8651$, what is 73×42 ?

- (a) 4372 (b) 3723 (c) 4327 (d) 4732 (e) 2734

13. In a row of 16 boys, when Pramod was shifted by two places towards the left, he became 7th from the left end. What was his earlier position from the right end of the row?

- (a) 7th (b) 8th (c) 9th (d) 10th (e) None of these

14. A bus for Trivandrum leaves every 30 minutes from a bus stand. On enquiring, the clerk told a passenger that the bus had already left ten minutes ago and the next bus will leave at 9.35 am. At what time did the clerk give this information to the passenger?

- (a) 9.10 am (b) 8.55 am (c) 9.08 am (d) 9.05 am (e) 9.15 am

15. In a row of 21 girls, when Anita was shifted by four places towards the right, she became 12th from the left end. What was her earlier position from the right end of the row?

- (a) 9th (b) 10th (c) 11th (d) 12th (e) 14th

ANSWERS

- | | | | |
|--------|---------|--------|--------|
| 1. (c) | 2. (c) | 3. (b) | 4. (a) |
| 5. (c) | 6. (e) | 7. (b) | 8. (b) |
| 9. (d) | 10. (d) | | |
- | | | | |
|---------|---------|---------|---------|
| 11. (c) | 12. (c) | 13. (b) | 14. (e) |
| 15. (e) | | | |

Explanations

1. There are three such 8s which are preceded by 7 but not immediately followed by 4.
2. There are three such 3s which are immediately preceded by 6 but not immediately followed by 7.
3. No. of numbers which are divisible by 7 from 11 to 50 = $\frac{49 - 14}{7} + 1 = 6$. But out of these which are divisible by 3 = 21 and 42.
 \therefore Required numbers = 14, 28, 35, 49.
 \therefore Required no. of numbers = 4.
4. Numbers from 1 to 100 which are divisible by 4 and has 4 as a digit are 4, 24, 40, 44, 48, 64, 84.
 \therefore Required number of numbers = 7.
5. Rank of Abhishek from last = $31 - 13 + 1 = 19$.
6. Savitha's present position = 15th from left = Anita's previous position = 9th from right
 \therefore No. of girls in the row = $15 + 9 - 1 = 23$.
7. Number of days = $6 + 29 + 31 + 30 + 15 = 111$
 $(\because$ Number of days in February in the year 1988 is 29).
8. According to Ram, Lakshman's birthday is on one of the days among 20th and 21st November.
According to Anil, Lakshman's birthday is on one of the days among 21st, 22nd and 23rd November.
The day common in both is 21st November. Therefore, Lakshman's birthday is on 21st November.
9. There are four such 5s in the given series.
10. There are three such instances in which an even number is followed by two odd numbers.
11. As per the first condition, if x is the number, $8 > x > 3$. As per second condition $10 > x > 6$
Taking two conditions together, $8 > x > 6$.
 \therefore The number is 7.
12. Given, $16 \times 85 = 8651$
Similarly $73 \times 42 = 4327$
i.e. by placing from unit's place of product, digits in ten's place of first number, unit's place of second number, unit's place of first number and ten's place of second number.
13. 1 2 3 4 5 6 P 8 9 10 11 12 13 14 15 16

P denotes Pramod's new position.
 \therefore His earlier position from right end of row = $16 - 9 + 1 = 8$
14. Bus leaves to Trivandrum every 30 minutes
The last bus left 10 minutes before
The next bus will leave at 9.35 am
 \therefore Time at which information got = $9.35 - 0.30 + 0.10 = 9.15$ am
15. Anita's earlier position = $12 - 4 = 8$ th from left end.
 \therefore Position from right = $21 - 8 + 1 = 14$ th

Decision Making

In this type of test, a vacancy is declared. The necessary qualifications required in the candidates coming up to fill the vacancy are provided and the merits of the candidates mentioned. The decision about each candidate has to be made from among the five choices named (a), (b), (c), (d), and (e) which state the courses of action to be taken as per the candidate's potentials.

EXAMPLE (1–5): Study the following information carefully and answer the questions given below it.

Following are the qualifications necessary for the recruitment of a librarian in a state university.

The candidate must:

1. have a master's degree in Library Science with at least 55% marks or the equivalent grade and a consistently good academic record.
2. have one year specialisation in an area of Information Technology/Archives and manuscript keeping master's degree in an area of thrust in the institution.
3. have at least ten year's experience as a deputy librarian in a university.
4. bear an evidence of innovative library service and organisation of published work.
In the case of a candidate who:
5. has a 15 year's experience as a college librarian, the case may be referred to the Vice Chancellor.
6. having obtained less than 55% marks in library science but has 13 years' experience as a Deputy Librarian in a University, the case may be referred to the Registrar of the University for his consideration.
7. having an M.Phil./Ph.D. degree in Library Science/ Information Science/ Documentation/Archives and manuscript keeping but has only ten year's experience as a college librarian, the condition at (1) may be waived.

EXERCISE 1

Based on the above conditions and the information provided against each of the candidates in the questions given below, decide which of the following courses of action should be taken against each candidate.

Mark the answer as (a) if the candidate is to be selected; (b) if the candidate is not to be selected; (c) if the data are inadequate; (d) if the case is to be referred to the Registrar and (e) if the case is to be referred to the Vice Chancellor.

1. Ashok having Master's degree in Library Science with 70% marks and with one year specialisation in an area of Information Technology joined as a Librarian in the Indian College on 22nd February 1985. He also holds a certificate of innovative library science in the college.
2. Satheesh, an M.Phil in Library Science has been a Deputy Librarian in the MG University since 27th September 1988. He has also obtained master's degree in Archives and manuscript keeping. He holds the evidence of innovative organisation of published work of the college students doing Ph.D.
3. Gopala Krishnan has been a Deputy Librarian in the MS University since 1981. He holds an evidence of contributing library service in the same institution. He has a master's degree in Library Science with 53% marks.
4. Roy holding a Ph.D. degree in Library Science has one year specialisation in the Archives and manuscript keeping. He has been a Deputy Librarian in the Agriculture University since 11 May 1990. He also has a certificate of innovative Library service in a public library for three years.
5. Suresh Kumar has been a college librarian since 15 January, 1983. He holds an M.Phil Degree in Library Science.

ANSWERS

1. (e) 2. (a) 3. (b) 4. (a) 5. (c)

Explanations

1. Ashok fulfills conditions (1), (2) and (4). Being a college librarian for 16 years, he satisfies condition (5). So, the answer is (e).
2. Satheesh, being an M.Phil degree holder, satisfies condition (7) so that condition (1) may be waived. He satisfies conditions (2), (3) and (4). So he is selected and the answer is (a).
3. Gopala Krishnan satisfies condition (4). Being a Deputy Librarian for last 20 years, he satisfies condition (3). As the marks scored by him are less than 55%, he violates condition (1). So the answer is (b).
4. Roy, being a Ph.D. holder, satisfies condition (7) so that (1) is waived. He satisfies condition (2) and (4) and being a Deputy Librarian for eleven years, he satisfies condition (3). So the answer is (a).
5. As the candidate Suresh Kumar, being an M.Phil, satisfies condition (7) and so condition (1) is waived. He being a college librarian for 18 years satisfied condition (3). As there is no information regarding condition (2) and (4) are not mentioned, answer is (c).

EXERCISE 2

Study the following information carefully and answer the questions given below it.

[Bank PO]

The following are the criteria for the admission to medical courses in a college.

The student must:

1. have passed XII standard examination in science with at least 60 % marks.
2. be at least 18 years old as on 23.3.93.
3. have obtained at least 71% marks in the entrance examination.
4. be able to pay monthly tuition fee of ₹ 560.
5. be able to pay one time deposit of ₹ 18000.

In the case of a student who:

6. satisfies all other conditions except (5) and can pay one time deposit only upto ₹ 12,000, the case may be referred to the Director of the Institute.
7. satisfies all criteria except that at (1), the case may be referred to the chairman.
8. satisfies all criteria but has not yet received the result of the final examination of XII std. may be provisionally admitted.

On the basis of the above conditions and the information provided against each student in the questions given below, decide which of the following courses of action should be taken against each candidate.

Mark answer as (a) if the student is to be admitted; (b) if the student is not to be admitted; (c) if the case is to be referred to the Director; (d) if the case is to be referred to the Chairman; (e) if the student is to be provisionally admitted.

1. Nitin Sharma has passed XII standard examination with 62% marks and was 20 years old on 9th January, 1993. He has secured 75% marks in the entrance test. He can pay a tuition fee of ₹ 560 and a one time deposit of only ₹ 12000.
2. Rajendra Kumar has passed XII standard examination in Science with 55% marks. He was born on 26th March, 1974. He has secured 83% marks in the entrance examination. He can pay one time deposit of ₹ 18000 and monthly tuition fee of ₹ 560.
3. Prakash Mehra secured 60% and 72% marks in the XII standard and entrance examination respectively. He was 19 years old on 2nd December, 1992. He is able to pay the stipulated one time deposit and monthly tuition fee.
4. Mukesh Maheshwari was born on 15th February, 1974. He attained 51 % marks in XII standard examination and 75% marks in entrance test. He is able to pay monthly tuition fee of ₹ 560 and one time deposit of ₹ 18000.
5. Peeyush Yadav has appeared for the final exam of XII standard in Science stream. He was 19 years old on 25.7.92. He has secured 75 % in the entrance examination. He is able to pay one time deposit of ₹ 18000 and monthly tuition fee of ₹ 560.
6. Deepak Gupta passed XII standard in Science with 63% marks and was born on 1.6.73. He has secured 74% marks in the entrance examination and can pay monthly tuition fees of ₹ 560. He can pay one time deposit of ₹ 9000 only.
7. Harpal Singh, born on 8th September, 1974, passed XII standard examination in Science with 68% marks. He attained 69% marks in the Entrance Test and is able to pay the stipulated monthly tuition fee and one time deposit.
8. Rakesh Sharma, who attained 59% marks in XII std. examination and 73.5% marks in the entrance test, is able to pay the monthly tuition fee of ₹ 560 and one time deposit of ₹ 18000. He is 22 years of age.

9. Nisha Gupta, a 21 year old girl, passed the XII standard examination with 64% marks and the entrance test with 77% marks. She is able to pay the tuition fee of ₹ 560 and a one time deposit of ₹ 18000.
10. Jatin Narang was born on 7.9.74. He secured 72% marks in the entrance test. He has appeared for XII standard examination and can pay the stipulated tuition fee and one time deposit.

ANSWERS

1. (c) 2. (d) 3. (a) 4. (d) 5. (e) 6. (b) 7. (b) 8. (d) 9. (a) 10. (e)

Explanations

1. The candidate satisfies condition (6) instead of condition (5).
2. The candidate satisfies condition (7) instead of condition (1).
3. All conditions of eligibility are satisfied.
4. The candidate satisfies condition (7) instead of condition (1).
5. The candidate satisfies condition (8).
6. Condition (5) is not fulfilled.
7. Condition (3) is not fulfilled.
8. Condition (7) is not satisfied instead of condition (1).
9. All conditions of eligibility are satisfied.
10. As the candidate has not yet received the result of the final examination of XII standard, he satisfies condition (8).

Assertion and Reason

In this type of questions two statements will be given: Assertion (A) and Reason (R). You have to go through these statements and check whether the statement given as (A) and statement given as (R) are as stated in the following manner and you have to answer either (a), (b), (c) or (d).

- (a) Both (A) and (R) are individually true and (R) is the correct explanation of (A).
- (b) Both (A) and (R) are individually true, but (R) is not the correct explanation of (A)
- (c) (A) is true but (R) is false.
- (d) (A) is false but (R) is true.

EXERCISES

1. Assertion (A): The same face of the Moon is always presented to the Earth.
Reason (R): The moon rotates about its own axis in $23\frac{1}{2}$ days which is about the same time that it takes to orbit the earth. [IAS]
2. Assertion (A): Existence of human life on Venus is highly improbable.
Reason (R): Venus has extremely high level of CO₂ in its atmosphere [IAS]
3. Assertion (A): All the proteins in our food are digested in small intestine only.
Reason (R): The protein-digesting enzymes from pancreas are released into small intestine. [IAS]
4. Assertion (A): Amoeba reproduces by fission.
Reason (R): All unicellular organisms reproduce by asexual methods. [IAS]
5. Assertion (A): Bangalore receives much higher annual rainfall than that of Mangalore.
Reason (R): Bangalore has the benefit of receiving rainfall both from south-west and north-east monsoons. [IAS]
6. Assertion (A): The Central Rural Sanitation Programme was launched in 1986 to improve the quality of life of rural people in India.
Reason (R): The rural sanitation is a subject in the concurrent list in the constitution of India. [IAS]

7. Assertion (A): The west flowing rivers of peninsular India have no deltas.
Reason (R): These rivers do not carry any alluvial sediments. [IAS]
8. Assertion (A): The thickness of the atmosphere is maximum over the equator.
Reason (R): High insulation and strong convection currents occur over the equator. [IAS]
9. Assertion (A): In our houses, the current in AC electricity line changes directions 50 times per second.
Reason (R): The frequency of alternating voltage supplied is 50 Hz.
10. Assertion (A): Fatty acids should be a part of the balanced human diet.
Reason (R): The cells of the human body can't synthesize any fatty acids.
11. Assertion (A): India does not export natural rubber.
Reason (R): About 97% of India's demand for natural rubber is met from domestic production.
12. Assertion (A): For the first time, India had no trade deficit in the year 2002–03.
Reason (R): For the first time, India's exports crossed \$50 billion in the year 2002–03. [IAS]
13. Assertion (A): To dilute sulphuric acid, acid is added to water and not water to acid.
Reason (R): Specific heat of water is quite large. [IAS]
14. Assertion (A): Devaluation of currency may promote export.
Reason (R): The price of the country's product in the international market may fall due to devaluation.
15. Assertion (A): The fiscal deficit is greater than the budgetary deficit.
Reason (R): The fiscal deficit is the borrowing from RBI plus other liabilities of government to meet its expenditure.
16. Assertion (A): According to statistics, more female children are born each year than male children in India.
Reason (R): In India, the death rate of male child is higher than that of the female child.
17. Assertion (A): Insect resistant transgenic cotton has been produced by inserting Bt gene.
Reason (R): The Bt gene is derived from a bacterium.
18. Assertion (A): Information technology is fast becoming a very important field of activity in India.
Reason (R): Software is one of the major exports of the country and India has a very strong base in hardware.
19. Assertion (A): Chile continues to be an important producer of copper in the world.
Reason (R): Chile is endowed with the world's largest deposit of porphyry copper.
20. Assertion (A): Dolly was the first cloned mammal.
Reason (R): Dolly was produced by *in-vitro* fertilization.
21. Assertion (A): During the time of Akbar, for every ten cavalrymen, the mansabdars had to maintain twenty horses.
Reason (R): Horses had to be rested while on march and replacements were necessary in times of war.
22. Assertion (A): Lord Linlithgow described the August Movement of 1942 as the most serious rebellion since the Sepoy Mutiny.
Reason (R): There was massive upsurge of the peasantry in certain areas. [IAS]

- 23.** Assertion (A): The Gaudham School of Art bears the mark of Hellanistic influence.
 Reason (R): Hinayana form was influenced by that art. [IAS]
- 24.** Assertion (A): Formic acid is a stronger acid than acetic acid.
 Reason (R): Formic acid is an organic acid. [IAS]
- 25.** Assertion (A): At first the Turkish administration in India was essentially military.
 Reason (R): The country was parcelled out as Iqtas among leading military leaders. [IAS]
- 26.** Assertion (A): According to Asoka's edicts social harmony among the people was more important than religious devotion.
 Reason (R): He spreaded ideas of equity instead of promotion of religion. [IAS]
- 27.** Assertion (A): The temperature of a metal wire rises when an electric current is passed through it.
 Reason (R): Collission of metal atoms with each other releases heat energy.
- 28.** Assertion (A): The Khilafat movement did bring the urban Muslims into the fold of the National Movement.
 Reason (R): There was a predominant elements of anti-imperialism in both the National and Khilafat Movement.
- 29.** Assertion (A): Phenyl is used as a household germicide.
 Reason (R): Phenyl is a phenol derivative and phenol is an effective germicide.
- 30.** Assertion (A): Partition of Bengal in 1905 brought to an end the Moderate's role in the Indian Freedom Movement.
 Reason (R): The Surat session of Indian National Congress separated the Extremists from the Moderates.
- 31.** Assertion (A): The first ever bill to make primary education compulsory in India was rejected in 1911.
 Reason (R): Discontent would have increased if everybody could read.
- 32.** Assertion (A): Sodium metal is stored under kerosene.
 Reason (R): Metallic sodium melts when exposed to air.
- 33.** Assertion (A): The congress rejected the Cripps proposals.
 Reason (R): The Cripps Mission consisted solely of the whites.
- 34.** Assertion (A): The United States of America has threatened to ask the World Trade Organisation (WTO) to apply sanctions against the developing countries for the non-obsbergance of ILO conventions.
 Reason (R): The United States of America itself has adopted and implemented those ILO conventions.
- 35.** Assertion (A): During the reign of Shahjahan, Dara Sikh was sent on an expedition to Balkha, Badakhshan and Qandahar.
 Reason (R): The expedition sent by Shahjahan to the Middle-east was a marvellous success. [IAS]
- 36.** Assertion (A): Gandhi stopped the Non-Co-operation movement in 1922.
 Reason (R): Violence at Chauri Chaura led him to stop the movement. [IAS]
- 37.** Assertion (A): The reservation of thirty-three per cent of seats for women in Parliament and State Legislatures does not require constitutional amendment.
 Reason (R): Political parties contesting elections can allocate thirty-three per cent of seats they contest to women candidates without any constitutional amendment. [IAS]

38. Assertion (A): Wilful disobedience or non-compliance of court orders and use of derogatory language about judicial behaviour amount to contempt of court.
Reason (R): Judicial activism can't be practised without aiming the judiciary with punitive powers to punish contemptuous behaviour. [IAS]
39. Assertion (A): The emergence of economic globalisation does not imply the decline of socialist ideology.
Reason (R): The ideology of socialism believes universalism and globalism. [IAS]
40. Assertion (A): A diamond sparkles more than a glass imitation cut to the same shape.
Reason (R): The refractive index of diamond is less than that of glass. [IAS]
41. Assertion (A): The monsoonal rainfall decreases as one goes towards the west and north-west in the Ganga plain.
Reason (R): The moisture bearing monsoonal winds go higher up as one moves up in the Ganga plain. [IAS]
42. Assertion (A): A lock of Einstein's hair, if scientists could locate it and extract its DNA, could help in producing another Einstein, by cloning.
Reason (R): The DNA extracted from the cell of an embryo at an early stage of development can be transferred to individual eggs which in turn can be implanted into the uterus of a surrogate mother to give birth to an identical offspring.
43. Assertion (A): The USA re-emerged as India's single largest import source in the early nineties.
Reason (R): With swift political developments in the erstwhile Soviet Union, India gradually began to rely on the USA for its defence requirement. [IAS]
44. Assertion (A): In India, the political parties which formed the governments represented the majority of seats secured in the elections to the House of the people at the centre and the Legislative Assemblies in the states but not the majority of votes.
Reason (R): The elections based on the majority-vote-system decides the result on the basis of relative majority of votes secured. [IAS]
45. Assertion (A): A mixture of salt and ice gives temperature below 0°C.
Reason (R): The salt raises the freezing point of ice. [IAS]
46. Assertion (A): Hong Kong is to revert to China from British control in a few years.
Reason (R): The people of Hong Kong have opted for it in a referendum. [IAS]
47. Assertion (A): Balan wrote his memoirs in Turki.
Reason (R): Turki was the official language of the Mughal Court. [IAS]
48. Assertion (A): Minimum wages in India are fixed in accordance with the levels of living and the labour participation ratios.
Reason (R): All workers covered by the Minimum Wages Acts are above the poverty line. [IAS]
49. Assertion (A): Italy, Switzerland, Sweden and Norway have abundant power resources.
Reason (R): They have the largest coal deposits in Europe. [IAS]
50. Assertion (A): The Quit India movement marked the culmination of Indian national movement.
Reason (R): After the Quit India movement it was matter of time to find a suitable mechanisms for transfer of power. [IAS]

51. Assertion (A): The form of government in Rigvedic period was monarchy.
 Reason (R): Priest enjoyed both social and political status and influenced administration. [IAS]
52. Assertion (A): Rainfall is scanty on east of western ghats.
 Reason (R): The east of western ghats is on the lee side. [IAS]
53. Assertion (A): Insects are not affected by pesticides.
 Reason (R): Insects are killed by pesticides. [IAS]
54. Assertion (A): The finance commission aims at safeguarding the fiscal autonomy of the states.
 Reason (R): The finance commission is constituted every fifth year. [IAS]
55. Assertion (A): Soap removes oil and dirt.
 Reason (R): Soap increases the surface tension of water. [IAS]
56. Assertion (A): Red phosphorus is used in matchsticks.
 Reason (R): Red phosphorus is less dangerous compared to the white one. [IAS]
57. Assertion (A): Earthworm is a friend to the man.
 Reason (R): It decreases the soil erosion. [IAS]
58. Assertion (A): Dry battery can't be recharged.
 Reason (R): The chemical reaction is reversible. [IAS]
59. Assertion (A): India adopted UK's Parliamentary system.
 Reason (R): The Upper House has judicial power. [IAS]
60. Assertion (A): Colonialism has started in India during the 19th century.
 Reason (R): Industrial revolution demanded market places. [IAS]

ANSWERS

- | | | | | | | | | | |
|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| 1. (c) | 2. (b) | 3. (b) | 4. (c) | 5. (a) | 6. (c) | 7. (b) | 8. (b) | 9. (a) | 10. (c) |
| 11. (a) | 12. (a) | 13. (a) | 14. (a) | 15. (a) | 16. (c) | 17. (a) | 18. (a) | 19. (a) | 20. (b) |
| 21. (d) | 22. (a) | 23. (c) | 24. (b) | 25. (b) | 26. (b) | 27. (b) | 28. (d) | 29. (c) | 30. (d) |
| 31. (b) | 32. (a) | 33. (b) | 34. (a) | 35. (c) | 36. (a) | 37. (d) | 38. (b) | 39. (b) | 40. (c) |
| 41. (a) | 42. (c) | 43. (b) | 44. (b) | 45. (a) | 46. (c) | 47. (c) | 48. (c) | 49. (c) | 50. (d) |
| 51. (b) | 52. (a) | 53. (d) | 54. (b) | 55. (a) | 56. (a) | 57. (c) | 58. (c) | 59. (c) | 60. (a) |

Situation Reaction Test

In this test, a certain situation is described and the candidate is required to choose the most suitable reaction to the given situation from among the alternatives given. The test judges the reasoning power of the candidate and his ability to get correctly and promptly to a situation that may arise in emergency.

EXAMPLE 1 You are visiting a place for first time and are travelling in a bus. Suddenly you realise that the driver is taking the bus to a lonely place with no right intentions. You would:

- (a) with the help of some other passengers, try to baffle the driver and take over the bus.
- (b) sit and wait to face repercussions.
- (c) jump out of the running bus.
- (d) console the worried passengers.

Solution When you expect wrong doing of the driver, the immediate action to prevent it is the need. So the answer is **(a)**.

EXAMPLE 2 While playing cricket in the school, suddenly when you hit the ball, it strikes your classmate on the forehead and blood starts oozing out. You would:

- (a) run away from the field.
- (b) start fighting with the boy why he came in the way.
- (c) blame somebody else for the accident.
- (d) take the boy to the first-aid room.

Solution In the above situation, the urgent need is to provide first aid to the boy so that bleeding may stop. So the answer is **(d)**.

EXAMPLE 3 While you board a train at the station, you find a suitcase beneath your seat. You would:

- (a) report the matter to the police.
- (b) open the suitcase to look through its contents.

- (c) try to find out the address of the owner from the papers, etc. in the suitcase.
- (d) finding no one to claim it, take it into your own possession.

Solution As the case is a loss of a valuable article for the concerned owner, necessary steps have to be taken to hand over the article, by reporting the matter to the police. So the answer is (a).

EXERCISES

To each of the following questions, four probable answers have been given. Select the most appropriate alternative as the answer.

1. You are living in a college hostel. The *dal* served to you in the mess has a lot of stones. What would you do?
 - (a) leave eating the *dal* altogether.
 - (b) bring the matter to the notice of mess incharge.
 - (c) speak to the cook about changing the *dal*.
 - (d) buy your own *dal* and cook it in your room.
2. You are entrusted with the job of taking care of a child. If the child insists on doing something which you would not allow, you would:
 - (a) beat the child.
 - (b) threaten the child and make him quiet.
 - (c) try to make him understand why you will not allow the action.
 - (d) let the child cry.
3. You are driving your car on the road when you hit against a fruit vendor's cart. You would:
 - (a) escape from the site by driving away.
 - (b) abuse the fruit vendor for putting his cart on the way.
 - (c) pay the fruit vendor for the damage done to him.
 - (d) insist that it was not your fault.
4. While travelling in a train, you notice a man from the coach behind yours fall off the train. You would:
 - (a) pull the alarm chain so that the train may stop and the man may be helped.
 - (b) shout at the falling man asking him to get up quickly and entrain.
 - (c) jump off the train to assist the falling man.
 - (d) wait till the train stops at the next station and inform the railway authorities there.
5. You find that the person whom you call your friend has been cheating you. What would you do?
 - (a) break relations with him.
 - (b) give him tit for tat.
 - (c) make him realise his mistake.
 - (d) tell other friends about him.
6. You are alone in the house and there is quite a danger of thieves around. Just then, you hear a knock at the door. You would:
 - (a) open the door to see who is there.
 - (b) first peep out from the window to confirm whether you know the person.
 - (c) not open the door.
 - (d) ask the servant to see who is there.

7. You are returning from school. On the way, you find a sealed envelope in a street, fully addressed with unused stamps on it. You would:
- leave it there as it was and walk away.
 - remove the stamps and destroy the envelope.
 - open the envelope, find out who has dropped it by mistake, and send it to him if possible.
 - post it at the nearest letter box.
8. While firing crackers, a child gets severe burns on the hand. What would you do?
- dip the child's hands in cold water till there is no more burning sensation.
 - wash the hands with dettol.
 - send some one to call the doctor.
 - apply some ointment on the affected area.
9. If in the examination hall, you find that the question paper is too tough to be answered satisfactorily by you, the best thing to do for you is to:
- tell the examiner that the questions are out of course.
 - provoke the candidates to walk out of the examination hall.
 - try to know something from your neighbour.
 - try to solve the questions as much as you know with a cool head.
10. On reaching the railway station, you find that the train you wanted to catch is just to start and there is hardly any time for purchasing the ticket. The best thing for you is to:
- rush to the train rather than miss it and inform the TTI at the next stoppage about your inability to purchase the ticket.
 - rush to the train and perform your journey quietly.
 - first purchase the ticket and then catch the train if it is there.
 - miss the train rather than take the risk of boarding the moving train.
11. Your bathroom tap is leaking and is a constant source of irritating noise. You would:
- sleep with pillows upon your ears.
 - put a bucket underneath.
 - try to put up a cork upon the mouth of the tap.
 - call a plumber to repair the tap.
12. While attending your friend's party, you see your friend's muffler catching fire from the candle on the table behind him. You would:
- ask your friend to see behind him.
 - rush to call friend's mother.
 - rush and take out the muffler from his neck, drop it and pour water on it.
 - take out the muffler and throw it away.

ANSWERS

1. (b) 2. (c) 3. (c) 4. (a) 5. (c) 6. (b) 7. (d) 8. (a) 9. (d) 10. (a)
11. (d) 12. (c)

Mathematical Operations

This chapter deals with the questions on simple mathematical operations. Here, the four fundamental operations: plus (+), minus (-), multiplication (\times), and division (\div) and also, statement such as ‘less than’, ‘greater than’, ‘equal to’, ‘not equal to’, etc. are represented by symbols, different from the usual ones. The questions involving these operations are set using artificial symbols. The candidate has to substitute the real signs and solve the questions accordingly, to get the answer. Here are a few examples.

EXAMPLE 1 If ‘+’ means ‘ \div ’, ‘-’ means ‘ \times ’, ‘ \div ’ means ‘+’ and ‘ \times ’ means ‘-’, then

$$36 \times 12 + 4 \div 6 + 2 - 3 = ?$$

- (a) 2 (b) 18 (c) 42 (d) $6\frac{1}{2}$ (e) None of these

Solution Putting the proper sign in the given expression, we get

$$\begin{aligned} 36 - 12 \div 4 + 6 \div 2 \times 3 &= 36 - 3 + 3 \times 3 \\ &= 36 - 3 + 9 = 42 \end{aligned}$$

So, the answer is (c).

EXAMPLE 2 If ‘+’ means ‘minus’, ‘-’ means ‘multiplied by’, ‘ \div ’ means ‘plus’ and ‘ \times ’ means ‘divided by’, then

$$10 \times 5 \div 3 - 2 + 3 = ?$$

- (a) 5 (b) $53/3$ (c) 18 (d) 21 (e) None of these

Solution Using the proper signs, we get

$$\begin{aligned} 10 \div 5 + 3 \times 2 - 3 &= 2 + 3 \times 2 - 3 \\ &= 2 + 6 - 3 = 5 \end{aligned}$$

So, the answer is (a).

EXAMPLE 3 If ‘P’ denotes ‘+’, ‘Q’ denotes ‘-’, ‘R’ denotes ‘ \div ’ and ‘S’ denotes ‘ \times ’, then

$$1 \ 8 \ S \ 3 \ 6 \ R \ 1 \ 2 \ Q \ 6 \ P \ 7 = ?$$

- (a) 115 (b) 55 (c) $648/13$ (d) 25 (e) None of these

Solution Using proper signs, we get

$$\begin{aligned} 18 \times 36 \div 12 - 6 + 7 &= 18 \times 3 - 6 + 7 \\ &= 54 - 6 + 7 = 55 \end{aligned}$$

So, the answer is (b).

EXAMPLE 4 If ' $>$ ' denotes '+', ' $<$ ' denotes '−', ' $+$ ' denotes ' \div ', ' $-$ ' denotes '=' and ' \times ' denotes 'greater than', find which of the following statement is correct.

- | | |
|----------------------------------|----------------------------------|
| (a) $3 + 2 > 4 = 9 + 3 < 2$ | (b) $3 > 2 > 4 = 18 + 3 < 1$ |
| (c) $3 > 2 < 4 \times 8 + 4 < 2$ | (d) $3 + 2 < 4 \times 9 + 3 < 3$ |

Solution Using proper notations, we have

- | |
|---|
| (a) $3 \div 2 + 4 < 9 \div 3 - 2$ or $\frac{11}{2} < 1$, which is false. |
| (b) $3 + 2 + 4 < 18 \div 3 - 1$ or $9 < 5$, which is false. |
| (c) $3 + 2 - 4 > 8 \div 4 - 2$ or $1 > 0$, which is true. |
| (d) $3 \div 2 - 4 > 9 \div 3 - 3$ or $\frac{-5}{2} > 0$, which is false. |

So, the statement (c) is true.

EXERCISES

1. If ' $-$ ' means ' \times ', ' \times ' means '+', ' $+$ ' means ' \div ' and ' \div ' means ' $-$ ', then what will be the value of $40 \times 12 + 3 - 6 \div 60$? [Bank PO]

- | | | | | |
|--------|----------|--------|------------|-------------------|
| (a) 44 | (b) 7.95 | (c) 16 | (d) 479.95 | (e) None of these |
|--------|----------|--------|------------|-------------------|

2. If ' $+$ ' means ' \div ', ' \div ' means ' $-$ ', ' $-$ ' means ' \times ' and ' \times ' means ' $+$ ', what will be the value of the following expression $8 + 4 \div 3 \times 5 - 9$? [Bank PO]

- | | | | | |
|--------|--------------------|--------------------|--------|-------------------|
| (a) 44 | (b) $5\frac{2}{3}$ | (c) $6\frac{1}{3}$ | (d) 46 | (e) None of these |
|--------|--------------------|--------------------|--------|-------------------|

3. If ' $+$ ' means ' \div ', ' \times ' means ' $-$ ', ' \div ' means ' \times ' and ' $-$ ' means ' $+$ ', then $9 + 3 \div 4 - 8 \times 2 = ?$ [Bank PO]

- | | | | | |
|---------------------|--------------------|---------------------|--------|-------------------|
| (a) $-6\frac{1}{4}$ | (b) $6\frac{3}{4}$ | (c) $-1\frac{3}{4}$ | (d) 18 | (e) None of these |
|---------------------|--------------------|---------------------|--------|-------------------|

4. If ' $+$ ' means ' \div ', ' $-$ ' means ' \times ', ' \div ' means ' $-$ ' and ' \times ' means ' $+$ ', what will be the value of $8 + 6 \div 4 - 7 \times 3$? [SBI PO]

- | | | | | |
|---------------------|--------|---------------------|--------|-------------------|
| (a) $-\frac{23}{2}$ | (b) 14 | (c) $-\frac{71}{3}$ | (d) 12 | (e) None of these |
|---------------------|--------|---------------------|--------|-------------------|

5. If ' $+$ ' means ' \times ', ' $-$ ' means ' $+$ ' and ' \times ' means ' \div ', find the value of $5 + 4 - 18 \times 3$. [Bank PO]

- | | | | | |
|---------|-------|--------|--------|-------------------|
| (a) −34 | (b) 6 | (c) 26 | (d) 14 | (e) None of these |
|---------|-------|--------|--------|-------------------|

6. If ' $+$ ' means ' \div ', ' $-$ ' means ' $+$ ', ' \times ' means ' $-$ ' and ' \div ' means ' \times ', then $8 \div 4 - 6 + 3 \times 4 = ?$ [AAO Exam]

- | | | | | |
|-------|--------|-------|--------|-------------------|
| (a) 8 | (b) 46 | (c) 4 | (d) 13 | (e) None of these |
|-------|--------|-------|--------|-------------------|

7. If ' \div ' means '+', ' $-$ ' means ' \div ', ' \times ' means ' $-$ ' and ' $+$ ' means ' \times ', then $\frac{(36 \times 4) - 8 \times 4}{4 + 8 \times 2 + 16 \div 1} = ?$ [Railway Recruitment]

- | | | | |
|--------|--------|-------|-------|
| (a) 16 | (b) 12 | (c) 8 | (d) 0 |
|--------|--------|-------|-------|

8. If '+' stands for 'division', '-' stands for 'equal to', ' \times ' stands for 'addition', ' \div ' stands for 'greater than', '=' stands for 'less than', ' $>$ ' stands for 'multiplication' and ' $<$ ' stands for 'subtraction', then which of the following alternatives is correct?
- (a) $5 + 2 \times 1 = 3 + 4 > 1$ (b) $5 > 2 \times 1 - 3 > 4 < 1$
 (c) $5 \times 2 < 1 - 3 < 4 \times 1$ (d) $5 < 2 \times 1 \div 3 > 4 \times 1$
9. If 'L' denotes ' \times ', 'M' denotes ' \div ', 'P' denotes '+' and 'Q' denotes '=', then
 $1\ 6\ P\ 2\ 4\ M\ 8\ Q\ 6\ M\ 2\ L\ 3 = ?$
- (a) $13/6$ (b) $-\frac{1}{6}$ (c) $14\frac{1}{2}$ (d) 10 (e) None of these
10. If 'P' denotes '+', 'Q' denotes ' \times ', 'R' denotes ' \div ', 'S' denotes '-' and '=' denotes greater than, then which of the following statement is true?
- (a) $4\ P\ 8\ R\ 2\ S\ 1\ Q\ 6 = 1$ (b) $3\ S\ 1\ Q\ 8\ P\ 6\ R\ 2 = 0$
 (c) $8\ R\ 2\ S\ 3\ Q\ 4\ P\ 6 = 2$ (d) $9\ P\ 2\ Q\ 6\ S\ 4\ R\ 2 = 21$

ANSWERS

1. (e) 2. (a) 3. (d) 4. (c) 5. (c) 6. (e) 7. (d) 8. (b) 9. (d) 10. (c)

Explanations

1. Using the correct symbols, we have:

$$\text{Given expression} = 40 + 12 \div 3 \times 6 - 60 = 40 + 4 \times 6 - 60 = 40 + 24 - 60 = 4$$

2. Using correct symbols, we have:

$$8 \div 4 - 3 + 5 \times 9 = 2 - 3 + 5 \times 9 = 2 - 3 + 45 = 44$$

3. Using correct symbols, we have:

$$9 \div 3 \times 4 + 8 - 2 = 3 \times 4 + 8 - 2 = 12 + 8 - 2 = 18$$

4. Using correct symbols, we get:

$$8 \div 6 - 4 \times 7 + 3 = \frac{8}{6} - 28 + 3 = \frac{-71}{3}$$

5. Using correct symbols, we have:

$$5 \times 4 + 18 \div 3 = 20 + 6 = 26$$

6. Using correct symbols, we have:

$$8 \times 4 + 6 \div 3 - 4 = 32 + 2 - 4 = 30$$

7. Using correct symbols, we have

$$\frac{(36 - 4) \div 8 - 4}{4 \times 8 - 2 \times 16 + 1} = \frac{32 \div 8 - 4}{32 - 32 + 1} = \frac{4 - 4}{1} = 0$$

8. Using correct symbols in (b), we get

$$5 \times 2 + 1 = 3 \times 4 - 1 \quad \text{or} \quad 11 = 11, \text{ which is true.}$$

9. Using correct symbols, we get:

$$16 + 24 \div 8 - 6 \div 2 \times 3 = 16 + 3 - 3 \times 3 = 16 + 3 - 9 = 10$$

10. Using correct symbols we get:

(a) $4 + 8 \div 2 - 1 \times 6 = 1$ or $4 + 4 - 6 = 1$ or $2 = 1$, which is false.

(b) $3 - 1 \times 8 + 6 \div 2 = 0$ or $3 - 8 + 3 = 0$ or $-2 = 0$, which is false.

(c) $8 \div 2 - 3 \times 4 + 6 = -2$ or $4 - 12 + 6 = -2$ or $-2 = -2$, which is true.

(d) $9 + 2 \times 6 - 4 \div 2 = 21$ or $9 + 12 - 2 = 21$ or $+19 = 21$, which is false.

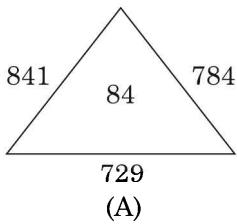
So, the answer is (c).

Inserting the Missing One

In this type of problems, a figure is given which is subdivided into a certain number of parts and each one bears a number except one subdivision. The numbers in the figure follow a particular pattern. You have to analyse the given figure and then fill in the blank space with the most suitable alternative.

Directions: Find the missing number from among the given alternatives.

EXAMPLE 1

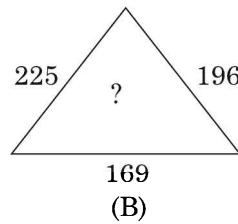


(a) 32

(b) 42

(c) 62

(d) 82

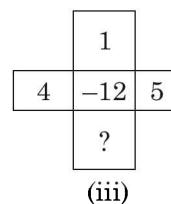
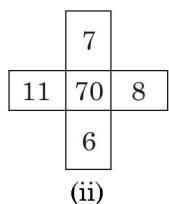
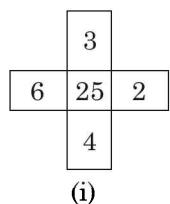


Solution In figure (A), $27^2 = 729$, $28^2 = 784$, $29^2 = 841$ and $27 + 28 + 29 = 84$.

Similarly, in figure (B), $13^2 = 169$, $14^2 = 196$, $15^2 = 225$ and $13 + 14 + 15 = 42$.

So, the answer is (b).

EXAMPLE 2



(a) 10

(b) 6

(c) 2

(d) 1

Solution In figure (i), $(3^2 + 6^2) - (2^2 + 4^2) = (9 + 36) - (4 + 16) = 45 - 20 = 25$

In figure (ii), $(7^2 + 11^2) - (6^2 + 8^2) = (49 + 121) - (36 + 64) = 170 - 100 = 70$

In figure (iii), $(1^2 + 4^2) - (5^2 + x^2) = -12$

or $(1 + 16) - (25 + x^2) = -12$

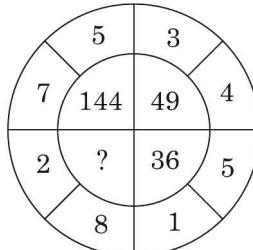
or $17 - 25 - x^2 = -12$

or $x^2 = 17 - 25 + 12 = 4$

$\therefore x = 2$

So, the answer is (c).

EXAMPLE 3



(a) 100

(b) 81

(c) 64

(d) 121

Solution Here, $(7 + 5)^2 = 144$; $(3 + 4)^2 = 49$; $(5 + 1)^2 = 36$;

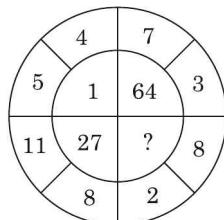
Similarly $(2 + 8)^2 = 100$

\therefore Missing number is 100.

EXERCISES

Directions: Find the missing number in each of the following questions:

1.



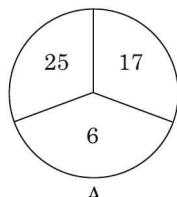
(a) 125

(b) 8

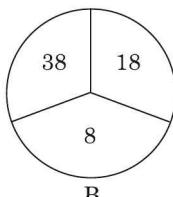
(c) 0

(d) 216

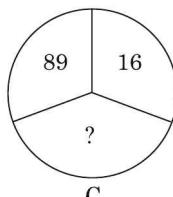
2.



(a) 19

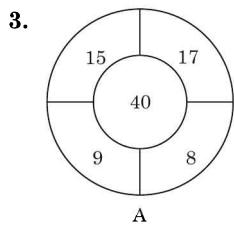


(b) 17

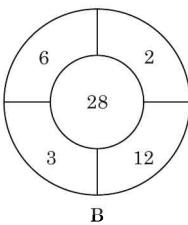


(c) 15

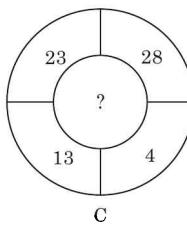
(d) 13



(a) 1

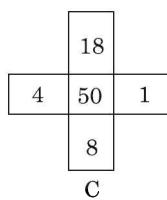
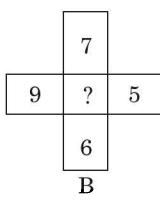
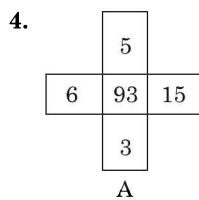


(b) 8



(c) 12

(d) 27



(a) 27

(b) 19

(c) 89

(d) 5

5.

| | | |
|-----|-----|-----|
| 7B | 5C | 6B |
| 3C | 9B | 19A |
| 15A | 17A | ? |

(a) 10C

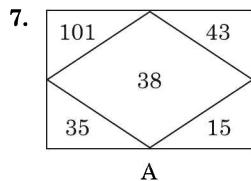
(b) 12C

(c) 14C

(d) 16C

6.

| | | |
|---|----|----|
| 9 | A | 12 |
| B | 10 | ? |
| 8 | C | 11 |

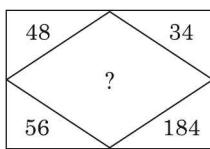
(a) $A = 13, B = 11, C = 9$ (b) $A = 13, B = 9, C = 11$ (c) $A = 9, B = 11, C = 13$ (d) $A = 9, B = 13, C = 11$ 

(a) 198

(b) 158

(c) 142

(d) 127



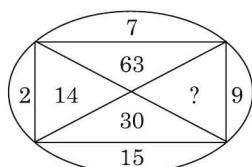
B

(a) 33

(b) 145

(c) 135

(d) 18

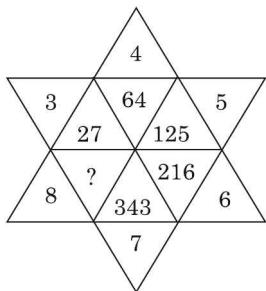


(a) 33

(b) 145

(c) 135

(d) 18

9.

(a) 64

(b) 512

(c) 16

(d) 24

10.

| | | | | | |
|---|----|----|---|----|---|
| 3 | 8 | 10 | 2 | ? | 1 |
| 6 | 56 | 90 | 2 | 20 | 0 |

(a) 0

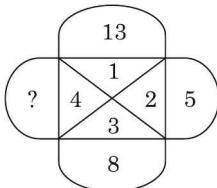
(b) 3

(c) 5

(d) 7

[Railways]

Directions: In each of the following questions, numbers have been arranged according to the pattern shown in the sample figure given below. Find the most correct alternative to fill in the space provided by question mark.

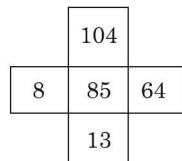
11.

(a) 10

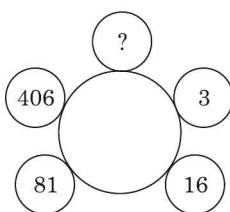
(b) 11

(c) 12

(d) 13



Sample figure

12.

(a) 2031

(b) 731

(c) 1625

(d) 1

13.

| | | |
|----|-----|-----|
| | 154 | |
| 14 | 221 | 196 |
| | | |
| ? | | |

(a) 11

(b) 13

(c) 15

(d) 17

14.

| | | |
|--------|--------|-----------|
| BD_3 | CE_5 | DF_{15} |
| EG_2 | FH_4 | GI_8 |
| HJ_4 | IK_6 | ? |

(a) JL_{24} (b) IJ_{18} (c) JK_{18} (d) JL_{12}

15.

| | | |
|---|----|---|
| | ? | |
| 3 | 39 | 9 |
| | 27 | |

(a) 33

(b) 81

(c) 243

(d) 42

ANSWERS

1. (d) 2. (c) 3. (a) 4. (c) 5. (d) 6. (d) 7. (c) 8. (c) 9. (b) 10. (c)
 11. (c) 12. (a) 13. (a) 14. (a) 15. (b)

Explanations

1. $(5 - 4)^3 = 1$; $(7 - 3)^3 = 64$; $(11 - 8)^3 = 27$; $(8 - 2)^3 = 216$.

∴ The missing number is 216.

2. The sum of the numbers in the upper two parts of each circle is seven times the number in the third part.

In figure A, $(25 + 17) = 42 = 7 \times (6)$

In figure B, $(38 + 18) = 56 = 7 \times (8)$

In figure C, $(89 + 16) = 105 = 7 \times (15)$

∴ The missing number is 15.

3. The difference of the product of the numbers in two lower parts and the sum of the numbers in two upper parts is the number inside the smaller circle.

In figure A, $(9 \times 8) - (15 + 17) = 72 - 32 = 40$

In figure B, $(3 \times 12) - (6 + 2) = 36 - 8 = 28$

Similarly, in figure C, $(13 \times 4) - (23 + 28) = 52 - 51 = 1$

∴ The missing number is 1.

4. In figure A, $(6 \times 3) + (5 \times 15) = 18 + 75 = 93$

In figure C, $(4 \times 8) + (18 \times 1) = 32 + 18 = 50$

Similarly, in figure B, $(9 \times 6) + (7 \times 5) = 54 + 35 = 89$

∴ The missing number is 89.

5. In each column, out of the letters A, B and C, each of these must appear once. Along the diagonal, the sum of two numbers is equal to the third number.

∴ The missing number will be $7 + 9 = 16$ and the letter will be C as A and B already appears once in that column.

6. The total of numbers in each row and each column is 30.

7. In figure (A), $(101 + 15) - (35 + 43) = 116 - 78 = 38$.

The same pattern would be followed in figure (B).

∴ The missing number = $(48 + 184) - (56 + 34) = 232 - 90 = 142$

8. We have $15 \times 2 = 30$; $2 \times 7 = 14$; $7 \times 9 = 63$;

∴ Missing number = $9 \times 15 = 135$.

9. We have, $3^3 = 27$; $4^3 = 64$; $5^3 = 125$; $6^3 = 216$; $7^3 = 343$.

∴ Missing number = $8^3 = 512$.

10. Let X denotes the number in the first row and Y that in the second row.

$$\begin{aligned}\therefore \quad & Y = X(X - 1) \\ \therefore \quad & 6 = 3(3 - 1); 56 = 8(8 - 1); \\ & 90 = 10(10 - 1); 2 = 2(2 - 1); \\ & 0 = 1(1 - 1);\end{aligned}$$

$$\begin{aligned}\text{So,} \quad & X(X - 1) = 20 \\ \therefore \quad & X = 5\end{aligned}$$

11. Arrangement is as follows:

Taking clockwise;
 $5 + 3 = 8; 8 + 4 = 12; 12 + 1 = 13;$

So, the missing number is 12.

12. Here taking the arrangement clockwise,

$$(3 \times 5) + 1 = 16; (16 \times 5) + 1 = 81; (81 \times 5) + 1 = 406;$$

$$\text{So } (406 \times 5) + 1 = 2031.$$

\therefore The missing number is 2031.

13. Let the missing number be x

From the given sample figure, $8 \times 13 = 104; 8^2 = 64; 8 + 13 + 64 = 85$.

Similarly, here $14^2 = 196$;

$$\begin{aligned}14 + x + 196 &= 221 \\ \therefore \quad x &= 11 \\ 14 \times 11 &= 154\end{aligned}$$

So, the missing number is 11.

14. The number in the third column in each row is obtained by multiplying the numbers in the first and second column in the same row.

\therefore In first row, $3 \times 5 = 15$ and in second row, $2 \times 4 = 8$.

\therefore Number to be filled in blank space $= 4 \times 6 = 24$.

\therefore From the given alternatives only (a) contains suffix 24.

So, the answer is (a).

15. Here, $3 + 27 + 9 = 39$

$? = 3 \times 27 = 81$ i.e., missing number $= 3 \times 27 = 81$.

So the answer is (b).

Logical Sequence of Words

In these type of questions, certain inter-related words are given and numbered, followed by various sequences of numbers denoting them, as alternatives. The candidate is required to arrange these words in a logical sequence based on a common property and then choose the correctly graded sequence from the given alternatives.

Some common sequences have been mentioned as follows:

I. Sequence of occurrence of events or various stages in a process:

EXAMPLE 1 Arrange the following in a logical order.

1. Birth 2. Marriage 3. Death 4. Funeral 5. Education

- | | |
|-------------------|-------------------|
| (a) 1, 4, 2, 5, 3 | (b) 1, 5, 2, 3, 4 |
| (c) 3, 4, 2, 5, 1 | (d) 2, 5, 4, 1, 3 |

Solution The given words when arranged in the order of various events occur in a man's life, form the sequence: Birth, Education, Marriage, Death, Funeral.

Therefore, the correct order becomes 1, 5, 2, 3, 4.

Hence, the answer is (b).

EXAMPLE 2 Arrange the following in a meaningful sequence:

1. Doctor 2. Fever 3. Prescribe 4. Diagnose 5. Medicine

- | | |
|-------------------|-------------------|
| (a) 1, 4, 3, 2, 5 | (b) 2, 1, 3, 4, 5 |
| (c) 2, 1, 4, 3, 5 | (d) 2, 4, 3, 5, 1 |

[CBI]

Solution Here fever occurs first. One then goes to a doctor. After diagnosing he prescribes medicine. Therefore, the correct order is: Fever, Doctor, Diagnose, Prescribe and Medicine.

Hence, the answer is (c).

II. Sequence of objects in a class or group, from part to the whole:

EXAMPLE 3 Arrange the following in a logical order.

1. Leaf 2. Fruit 3. Stem 4. Root 5. Flower

Solution The given words are part of a plant. Arranging them in order from bottom to top in the order of their occurrence, we get Root, Stem, Leaf, Flower and Fruit.

Hence the sequence is 4, 3, 1, 5, 2.

Hence, the correct answer is (d).

EXAMPLE 4 Arrange the following in a meaningful order, from particular to general.

Solution Here the village is the smallest area. A number of villages are combined to form a town. A number of towns are combined to form a district. So many districts are combined to form a state. So many states are clubbed to form a country. Hence the sequence is Village, Town, District, State, Country.

Thus, the correct order is 2, 4, 1, 5, 3.

Hence, the answer is (a).

III. Sequence of increasing/decreasing size, value, intensity, etc.

EXAMPLE 5 Arrange the following in a logical order.

Solution The given names when arranged in the order of increasing values, (i.e. from cheapest to costly) form the sequence:

Iron, Silver, Gold, Diamond, Platinum.

Hence, the answer is (b).

EXAMPLE 6 Arrange the following in a logical sequence from small to big.

Solution Here the given names can be arranged (from small to big) in a sequence as:

Mosquito, Cat, Tiger, Elephant, Whale.

Hence, the answer is (c).

IV. Sequence in which a chain of given objects is formed:

EXAMPLE 7 Arrange the following in a logical order.

Solution Here the names can be arranged in the order in which they are used for the manufacture of a book. It can be written as a sequence:

Jungle, Timber, Pulp, Paper, Book

Hence the sequence is 4, 3, 2, 5, 1

Hence, the answer is (c).

EXAMPLE 8 Arrange the following in a meaningful sequence:

1. Yarn 2. Plant 3. Saree 4. Cotton 5. Cloth

(a) 2, 4, 1, 5, 3

(b) 2, 4, 3, 5, 1

(c) 2, 4, 5, 1, 3

(d) 2, 4, 5, 3, 1

[CBI]

Solution Here the names given are the stages in the manufacture of saree. Therefore the sequence can be formed as: Plant, Cotton, Yarn, Cloth, Saree.

Hence the sequence is 2, 4, 1, 5, 3

Hence, the answer is (a).

EXERCISES

Directions (Q.1 to 10): In each of the following questions, arrange the given words in a meaningful sequence and then choose the most appropriate sequence from amongst the alternatives provided below each question:

1. 1. Sentence 2. Chapter 3. Letter 4. Book 5. Word 6. Paragraph

(a) 4, 2, 1, 6, 5, 3

(b) 4, 2, 6, 1, 5, 3

(c) 4, 6, 1, 2, 3, 5

(d) 4, 6, 2, 5, 1, 3

[CBI]

2. 1. Police 2. Punishment 3. Crime 4. Justice 5. Judgement

(a) 1, 2, 3, 4, 5

(b) 3, 1, 2, 4, 5

(c) 3, 1, 4, 5, 2

(d) 5, 4, 3, 2, 1

[SSC]

3. 1. College 2. Child 3. Salary 4. School 5. Employment

(a) 1, 2, 4, 3, 5

(b) 2, 4, 1, 5, 3

(c) 4, 1, 3, 5, 2

(d) 5, 3, 2, 1, 4

[RRB]

4. 1. Mother 2. Child 3. Milk 4. Cry 5. Smile

(a) 1, 5, 2, 4, 3

(b) 2, 4, 1, 3, 5

(c) 2, 4, 3, 1, 5

(d) 3, 2, 1, 5, 4

5. 1. Atomic Age 2. Metallic Age 3. Stone Age 4. Alloy Age

(a) 1, 3, 4, 2

(b) 2, 3, 1, 4

(c) 3, 2, 4, 1

(d) 4, 3, 2, 1

[MAT]

6. 1. Heel 2. Shoulder 3. Skull 4. Neck 5. Knee 6. Chest 7. Thigh 8. Stomach
9. Face 10. Hand

(a) 2, 4, 7, 10, 1, 5, 8, 9, 6, 3

(b) 3, 4, 7, 9, 2, 5, 8, 10, 6, 1

(c) 4, 7, 10, 1, 9, 6, 3, 2, 5, 8

(d) 3, 9, 4, 2, 10, 6, 8, 7, 5, 1

[SSC]

7. 1. Rain 2. Monsoon 3. Rescue 4. Flood 5. Shelter 6. Relief

(a) 1, 2, 3, 4, 5, 6

(b) 1, 2, 4, 5, 3, 6

(c) 2, 1, 4, 3, 5, 6

(d) 4, 1, 2, 3, 5, 6

[SSC]

8. 1. Never 2. Sometimes 3. Generally 4. Seldom 5. Always

(a) 5, 2, 1, 3, 4

(b) 5, 2, 4, 3, 1

(c) 5, 3, 1, 2, 4

(d) 5, 3, 2, 4, 1

[SSC]

9. 1. Butterfly 2. Cocoon 3. Egg 4. Worm
 (a) 1, 3, 4, 2 (b) 2, 4, 1, 3
 (c) 1, 4, 3, 2 (d) 3, 4, 2, 1 [CBI]
10. 1. Site 2. Plan 3. Rent 4. Money 5. Building 6. Construction
 (a) 1, 2, 3, 6, 5, 4 (b) 2, 3, 6, 5, 1, 4
 (c) 3, 4, 2, 6, 5, 1 (d) 4, 1, 2, 6, 5, 3

[Hotel Management]

ANSWERS

1. (b) 2. (c) 3. (b) 4. (b) 5. (c) 6. (d) 7. (c) 8. (d) 9. (d) 10. (d)

(Solutions and Hints)

- In this words are arranged such that each successive term constitute part of first word.
 i.e., Book → Chapter → Paragraph → Sentence → Word → Letter.
 Chapter constitutes part of a book.
 Paragraph constitutes part of a chapter etc.
- In this words are arranged according to the order of occurrence.
 Here *crime* was done first. Interference of *Police* occurs as second. After the criminal was caught by the police he will be brought to the count before the *Justice*. After the hearing is over, *judgement* will be issued. Based on that *punishment* will be given to the criminal. Therefore crime, police, justice, judgement and punishment is the required order.
- The sequence of words here represents different stages from birth of a person to his final stage in his career. Here Child → School → College → Employment → Salary the sequence mention that first stage of a person is *child*. After some time that child will go to *school*, then *college*. After completing his study in the college, he will appear for various competitive examinations for a job. Then on getting success in the examination, he will get an *employment*. After getting employed he will get *salary*. Therefore the sequence is 2, 4, 1, 5, 3.
 Hence answer is (b).
- The sequence here represents various expression of a child in different situations.
 Here *child* first *cries*. While crying *mother* will give *milk* to the child. Then the child will smile on getting milk.
 Hence sequence is Child → Cry → Mother → Milk → Smile.
 Hence answer is (b).
- The sequence here represents different periods in order. i.e., Stone age → Metallic age → Alloy age → Atomic age.
 Hence answer is (c).
- This sequence consists of body parts from head to toe in order. Therefore sequence is Skull → Face → Neck → Shoulder → Hand → Chest → Stomach → Thigh → Knee → Heel.
 Hence answer is (d).
- This sequence consists of climatic changes from monsoon and subsequent processes. Therefore sequence in Monsoon → Rain → Flood → Rescue → Shelter → Relief.
 Hence answer is (c).
- This sequence contains the same word with different intensity in the decreasing order of intensity. i.e., Always → Generally → Sometimes → Seldom → Never.
 Hence answer is (d).

9. This sequence consists of different stages of formation of Butterfly from its egg.
i.e., Egg → Worm → Cocoon → Butterfly.
Hence answer is (d).
10. This sequence consists of different names related to construction of a building in the order of execution/priority. i.e., Money → Site → Plan → Construction → Building → Rent.
i.e., First priority is given for money. After arranging money, place or land is bought for construction which is the site. After having the site, plan is prepared for construction of building. After construction is over building got ready for occupying. Then the building is given for rent.
Hence answer is (d).

SECTION B LOGICAL DEDUCTION

Chapter 16

Logic

Logic is the science of thought as expressed in language. Questions based on logic are to be solved considering the given statements as they are true without considering the formal validity or the truth of the statements. i.e., the conclusion should follow directly from the statements given.

LOGICAL REASONING: In logic, a statement of certain relation between two or more terms is analogous to a sentence in grammar.

The proposition consists of three parts, namely subject, predicate and copula.

1. **Subject:** The subject is about which something is said.
2. **Predicate:** The predicate is the part of the proposition denoting which is affirmed or denied about the subject.
3. **Copula:** The copula is that part of the proposition which denotes the relation between the subject and the predicate.

EXAMPLE 1 Consider the proposition ‘Man is intelligent’. Here the information is given about the man. So ‘Man’ is the subject.

‘Intelligent’ is the quality affirmed for this subject. So it is the predicate. ‘Is’ denotes the relation between the subject and the predicate. So, it is the copula.

CLASSIFICATION OF PROPOSITIONS: ‘Propositions’ can be classified into four types:

1. Universal Affirmative Proposition (denoted by A): This distributes only the subject i.e. the predicate is not interchangeable with the subject while maintaining the validity of the proposition.

EXAMPLE 2 All books are pens.

This is proposition A since we cannot say ‘All pens are books’.

2. Universal Negative Proposition (denoted by E): This distributes both the subject and the predicate, i.e. an entire class of predicate term is denied to the entire class of the subject term, as in the proposition. For example,
No pen is pencil.
3. Particular Affirmative Proposition (denoted by I): This distributes neither the subject nor the predicate. For example,
Some pupil are brilliant.
Here subject term 'some pupil' is used not for all but only for some students and similarly the predicate term 'brilliant' is affirmed for a part of subject class. So both are undistributed.
4. Particular Negative Proposition (denoted by O): This distributes only the predicate. For example,
Some cats are not dogs.
Here, the subject term 'some cats' is used only for a part of its class and hence is undistributed while the predicate term 'dogs' is denied in entity to the subject term and hence is distributed.

The above four types of proposition can be summarised as follows:

| Proposition | Type |
|--|-----------------|
| (a) (A) distributes subject only | All S is P |
| (b) (E) distributes both subject and predicate | No S is P |
| (c) (I) distributes neither | Some S is P |
| (d) (O) distributes predicate only | Some S is not P |

| Statement Form | Type of Proposition | Distributes |
|---------------------|------------------------|-----------------|
| (A) All S is P | Universal affirmative | S only |
| (B) No S is P | Universal negative | Both S and P |
| (I) Some S is P | Particular affirmative | Neither S nor P |
| (O) Some S is not P | Particular negative | P only |

LOGICAL DEDUCTION: The phenomenon of deriving a conclusion from a single proposition or a set of given proposition is known as ***logical deduction***. The given proposition are also referred to as the premise.

There are two inferential processes of deduction.

Immediate Deductive Inference: Here the conclusion is deduced from one of the given propositions, by any of the three ways—conversion, obversion and contraposition.

Conversion: The conversion proceeds with interchanging the subject term and predicate term, i.e. the subject term of the premise becomes the predicate term of the conclusion and the predicate term of the premise becomes the subject of the conclusion.

The given proposition is called ***convertend***, whereas the conclusion drawn from it is called its ***converse***.

Valid conversions

| Convertend | Converse |
|---|--|
| A: All S is P Example: All books are pens. | I: Some P is S Some pens are books. |
| E: No S is P Example: No cat is dog. | E: No P is S No dog is cat. |
| I: Some S is P Example: Some boys are foolish. | I: Some P is S Some fools are boys. |
| O: Some S is not P | No valid conversion |

In a conversion, quality remains the same and the quantity may change.

Obversion: In obversion, we change the quality of the proposition and replace the predicate term by its complement.

Valid obversions

| Obvertend | Obverse |
|--|---|
| A: All birds are mammals. E: No poets are singers. I: Some men are engineers. O: Some politicians are not honest. | E: No birds are non-mammals. A: All poets are non-singers O: Some men are not non-engineers. I: Some politicians are non-honest. |

Contraposition: In contraposition, we first replace the subject and predicate terms in the proposition and then exchange both these terms with their complements.

Valid contrapositions

| Proposition | Contrapositive |
|---|---|
| A: All humans are animals. I: Some humans are animals. | A: All non-animals are non-humans. I: Some non-animals are non-humans. |

MEDIATE DEDUCTIVE INFERENCE (SYLLOGISM): A syllogism is a deductive argument in which the conclusion has to be drawn from two propositions referred to as the premises.

Example: 1. All girls are students.
2. All students are brilliant.
3. All girls are brilliant.

Here, the propositions 1 and 2 are the premises and the proposition 3, which follows from the first two propositions, is called the *conclusion*.

In logic, a *term* is a word or a combination of words, which by itself can be used as a subject or predicate of a proposition.

Syllogism is concerned with three terms:

1. **Major Term:** This is the predicate of the conclusion and is denoted by P (first letter of 'Predicate').
2. **Minor Term:** This is the subject of the conclusion and is denoted by S (first letter of 'Subject').
3. **Middle Term:** This is the term common to both the premises and is denoted by M (first letter of 'Middle').

Example: Premises: 1. All cats are animals.
2. All tigers are cats.

Conclusion: All tigers are animals.

Here, 'Animals' is the predicate of the conclusion and so it is the major term P.
'Tigers' is the subject of the conclusion and so, it is the minor term, S.
'Cats' is the term common to both the premises and so it is the middle term, M.

Major and Minor Premises: Of the two premises, the major premise is that in which the middle term is the subject and the minor premise is that in which the middle term is the predicate.

RULES FOR DERIVING THE CONCLUSION FROM TWO GIVEN PREMISES

1. The conclusion does not contain the middle term.

EXAMPLE 1

Statements : 1. All desks are tables.
2. Some tables are chairs.

Conclusions: 1. All tables are desks.
2. Some tables are not chairs.

Since both the conclusions 1 and 2 contain the middle term 'tables', neither of them can follow.

2. No term can be distributed in the conclusion unless it is distributed in the premises.

EXAMPLE 2

Statements : 1. Some students are boys.
2. All boys are fools.

Conclusions: 1. All fools are boys.
2. Some students are fools.

Statement 1 is an I-type proposition which distributes neither the subject nor the predicate. Statement 2 is an A-type proposition which distributes the subject i.e., 'boys' only.

Conclusion 1 is an A-type proposition which distributes the subject 'fools' only.

Since the term 'fools' is distributed in conclusion 1 without being distributed in the premise, so conclusion 1 cannot follow.

- 3. The middle term (M) should be distributed at least once in the premise.
Otherwise, the conclusion cannot follow.**

For the middle term to be distributed in a premise,

- (i) M must be the subject if premise is an A type proposition.
- (ii) M must be subject or predicate if premise is an E type proposition.
- (iii) M must be predicate if premise is an O type proposition.

In an I type proposition, which distributes neither the subject nor the predicate, the middle term cannot be distributed.

EXAMPLE 3

Statements : 1. All clocks are watches.

 2. Some watches are red.

Conclusions: 1. All watches are clocks.

 2. Some clocks are red.

In the premises, the middle term is 'watches'. Clearly, it is not distributed in the first premise, which is an A type proposition as it does not form its subject. It is not distributed in the second premise which is an I type proposition.

Since the middle term is not distributed even in both the premises, so no conclusion follows:

- 4. No conclusion follows:**

(a) *if both the premises are particular.*

EXAMPLE 4

Statements : 1. Some pens are pencils.

 2. Some pencils are rulers.

Conclusions: 1. All pens are rulers.

 2. Some rulers are pens.

Since both the premises are particular, no definite conclusion follows:

(b) *if both the premises are negative.*

EXAMPLE 5

Statements : 1. No mango is pineapple.

 2. No pineapple is coconut.

Conclusions: 1. No mango is coconut.

 2. Some coconuts are pineapples.

Since both the premises are negative, neither conclusion follows:

(c) *if the major premise is particular and the minor premise is negative.*

EXAMPLE 6

Statements : 1. Some cows are bulls.

 2. No cats are cows.

Conclusions: 1. No cows are cats.

 2. Some bulls are cats.

Here, the first premise containing the middle term 'cows' as the subject is the major premise and the second premise containing the middle term 'cows' as

the predicate in the minor premise. Since the major premise is particular and the minor premise is negative, no conclusion follows.

5. If the middle term is distributed twice, the conclusion cannot be universal.

EXAMPLE 7

- Statements : 1. All tables are cots.
 2. No chairs are tables.

- Conclusions: 1. No chairs are cots.
 2. Some chairs are cots.

Here, the first premise is an A type proposition and so, the middle term 'tables' forming the subject is distributed. The second premise is an E type proposition and so the middle term 'tables' forming the predicate is distributed.

Since the middle term is distributed twice, the conclusion cannot be universal.

6. If one premise is negative, the conclusion must be negative.

EXAMPLE 8

- Statements : 1. All pens are rubbers.
 2. No rubber is pencil.

- Conclusions: 1. No pens are pencils.
 2. Some pencils are pens.

Since one premise is negative, the conclusion must be negative. So conclusion 2 cannot follow.

7. If one premise is particular, the conclusion must be particular.

EXAMPLE 9

- Statements : 1. Some men are thieves.
 2. All thieves are intelligent persons.

- Conclusions: 1. Some men are intelligent persons.
 2. All intelligent persons are men.

Since, one premise is particular, the conclusion must be particular. so, conclusion 2 cannot follow.

8. If both the premises are affirmative, the conclusion must be affirmative.

EXAMPLE 10

- Statements : 1. All cows are cats.
 2. All cats are bulls.

- Conclusions: 1. All cows are bulls.
 2. Some cows are not bulls.

Since both the premises are affirmative, the conclusion must be affirmative. So, conclusion 2 cannot follow.

9. If both the premises are universal, the conclusion must be universal.

Complementary pair: A pair of contradictory statements, i.e. a pair of statements such that if one is true, the other is false and when no definite conclusion can be drawn, either of them is bound to follow, is called a *complementary pair*.

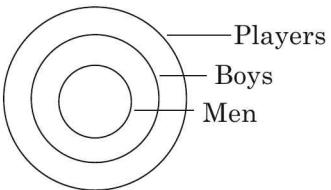
E and I type propositions together form a complementary pair and usually either of them follows, in a case where we cannot arrive at a definite conclusion, using the rules of syllogism.

Study the various possible cases and draw all possible inferences in each case, along with verification through Venn diagrams.

Case 1: All men are boys. All boys are players.

Immediate Deductive Inferences: The converse of first premise ‘Some boys are men’ and the converse of second premise ‘Some players are boys’ both hold good.

Mediate Deductive Inferences: Since both the premises are universal and affirmative, the conclusion must be universal and affirmative. Also, the conclusion should not contain the middle term. Therefore, it follows that ‘All men are players’. The converse of this conclusion ‘Some players are men’ also holds good.

| Venn Diagram | Inferences |
|---|---|
|  | <ol style="list-style-type: none"> 1. Some boys are men. 2. Some players are boys. 3. All men are players. 4. Some players are men. |

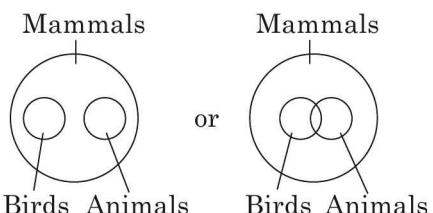
Case 2: All birds are mammals.

All animals are mammals.

Immediate Deductive Inferences: The converse of first premise, ‘Some mammals are birds’ and the converse of second premise ‘Some mammals are animals’ both hold good.

Mediate Deductive Inferences: Both, being A-type propositions, distribute subject only.

Thus, the middle term ‘mammals’ is not distributed even once in the premises. Therefore, no definite conclusion follows.

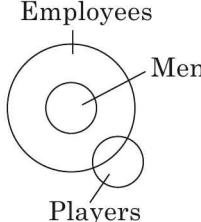
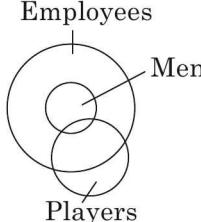
| Venn Diagram | Inferences |
|---|---|
|  | <ol style="list-style-type: none"> 1. Some mammals are birds. 2. Some mammals are animals. 3. Either ‘No bird is animal’ or ‘Some birds are animals’ as E and I-type propositions form a complementary pair. |

Case 3: All men are employees.

Some employees are players.

Immediate Deductive Inferences: The converse of first premise ‘Some employees are men’ and the converse of the second premise ‘Some players are employees’, both hold good.

Mediate Deductive Inferences: The first premise is an A-type proposition which distributes the subject only while the second premise is an I-type proposition which distributes neither subject nor predicate. Since the middle term 'boys', is not distributed even once in the premises, no definite conclusion can be drawn.

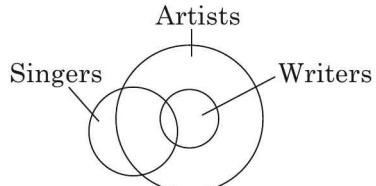
| Venn Diagram | Inferences |
|---|---|
|  <i>or</i>  | <ol style="list-style-type: none"> 1. Some employees are men. 2. Some players are employees. 3. Either 'No men is player' or 'Some men are players' as E and I-type proposition form a complementary pair. |

Case 4: Some singers are writers.

All writers are artists.

Immediate Deductive Inferences: The converse of the first premise 'Some writers are singers' and the converse of the second premise 'Some artists are writers', both hold good.

Mediate Deductive Inferences: Since one premise is particular the conclusion must be particular and should not contain the middle term. so it follows that 'Some singers are artists.' The converse of this conclusion 'Some artists are singers' also holds good.

| Venn Diagram | Inferences |
|---|--|
|  | <ol style="list-style-type: none"> 1. Some writers are singers. 2. Some artists are writers. 3. Some singers are artists. 4. Some artists are singers. |

Case 5: All boys are players. Some boys are writers.

Immediate Deductive Inferences: The converse of the first premise 'Some players are boys' and the converse of the second premise 'Some writers are boys' both hold good.

Mediate Deductive Inferences: Since the premise is particular, the conclusion must be particular and should not contain the middle term. So, it follows that 'Some players are writers' and the converse of this conclusion 'Some writers are players' also holds good.

| Venn Diagram | Inferences |
|--------------|---|
| | <ol style="list-style-type: none"> 1. Some players are boys. 2. Some writers are boys 3. Some players are writers. 4. Some writers are players. |

Case 6: All boys are students. Some men are students.

Immediate Deductive Inferences: The converse of the first premise ‘Some students are boys’ and the converse of the second premise ‘Some students are men’ both hold good.

MEDIATE DEDUCTIVE INFERENCES: The first premise is an A-type proposition, which distributes subject only. The second premise is an I-type proposition, which distributes neither subject nor predicate. So the middle term ‘students’ is not distributed even once in the premises. Hence, no definite conclusion can be drawn.

| Venn Diagram | Inferences |
|--------------|--|
| | <ol style="list-style-type: none"> 1. Some students are boys. 2. Some students are men. 3. Either ‘No boy is man’ or ‘some boys are men’ follows. |

Case 7: Some balls are sticks. Some sticks are erasers.

Immediate Deductive Inferences: The converse of the first premise ‘Some sticks are balls’ and the converse of the second premise ‘Some erasers are sticks’ both hold good.

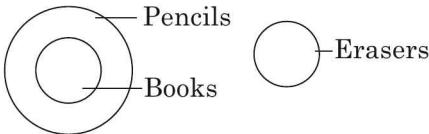
Mediate Deductive Inferences: Since both premises are particular, no definite conclusion follows.

| Venn Diagram | Inferences |
|--------------|---|
| | <ol style="list-style-type: none"> 1. Some sticks are balls. 2. Some erasers are sticks. 3. Either ‘Some balls are erasers’ or ‘No ball is eraser’ follows as I and E-type propositions form a complementary pair. |

Case 8: All books are pencils. No pencil is eraser.

Immediate Deductive Inferences: The converse of the first premise ‘Some pencils are books’ and the converse of the second premise ‘No eraser is pencil’, both hold good.

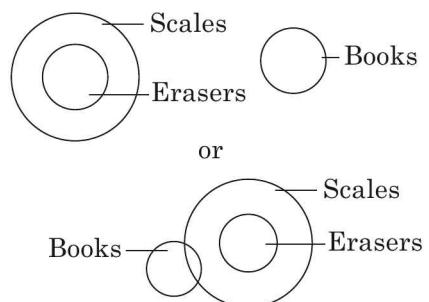
Mediate Deductive Inferences: Since both premises are universal, the conclusion must be universal. Since one premise is negative, the conclusion must be negative. So ‘No book is eraser’ follows. The converse of the conclusion ‘No eraser is book’ also holds good.

| Venn Diagram | Inferences |
|---|---|
|  | <ol style="list-style-type: none"> Some pencils are books. No eraser is pencil. No book is eraser. No eraser is book. |

Case 9: No book is eraser. All erasers are scales.

Immediate Deductive Inferences: The converse of the first premise ‘No eraser is book’ and the converse of the second premise ‘Some scales are erasers’, both hold good.

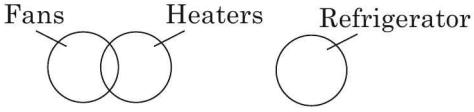
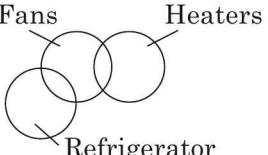
Mediate Deductive Inferences: The first premise, an E-type proposition, distributes both the subject and the predicate. Second premise, an A-type proposition, distributes the subject. Thus, the middle term ‘eraser’ is distributed twice in the premises. So conclusion cannot be universal. One premise is negative. So the conclusion must be negative. Thus the conclusion must be particular negative (i.e., O-type). Therefore ‘Some scales are not books’ follows.

| Venn Diagram | Inferences |
|--|--|
|  | <ol style="list-style-type: none"> No eraser is book. Some scales are erasers. Some scales are not books. Either ‘Some books are scales’ or ‘No book is scale’ follows as E and I-type propositions form a complementary pair. |

Case 10: Some fans are heaters. No heater is refrigerator.

Immediate Deductive Inferences: The converse of the first premise ‘Some heaters are fans’ and the converse of the second premise ‘No refrigerator is heater’, both hold good.

Mediate Deductive Inferences: Since the first premise is particular and the second premise negative, the conclusion must be particular and negative or O-type. Therefore, it follows that ‘Some fans are not refrigerators.’

| Venn Diagram | Inferences |
|--|--|
|  or  | <ol style="list-style-type: none"> 1. Some heaters are fans. 2. No refrigerator is heater. 3. Some fans are not refrigerators. 4. Either 'Some fans are refrigerators' or 'No fan is refrigerator' follows as E and I-type propositions form a complementary pair. |

Note: While deriving logical conclusions, always remember that the following conclusions hold:

- (i) The converse of each of the given premises;
- (ii) The conclusion that directly follows from the given premises in accordance with the rules of syllogism; and
- (iii) The converse of the derived conclusions.

TYPE I: TWO-PREMISE ARGUMENTS (a) WITH TWO CONCLUSIONS

Directions (1 to 10): In each question below are given two statements followed by two conclusions numbered I and II. You have to take the given two statements to be true even if they seem to be at variance from the commonly known facts and then decide which of the given conclusions logically follows from the given two statements, disregarding commonly known facts.

Give answer (a) if only conclusion I follows; (b) if only conclusion II follows; (c) if either I or II follows; (d) if neither I nor II follows; and (e) if both I and II follow.

1. Statements: All cakes are ice creams.
All ice creams are toffees.

- Conclusions: I. All cakes are toffees.
II. All toffees are ice creams.

[RRB Exam]

2. Statements: Some pearls are gems.
Some gems are ornaments.

- Conclusions: I. Some gems are pearls.
II. Some ornaments are gems.

[Bank PO]

3. Statements: All lights are trucks.
Some trucks are jeeps.

- Conclusions: I. All jeeps are lights.
II. Some lights are jeeps.

[Bank PO]

4. Statements: Lawyers married only fair girls.
Sobha is very fair.

- Conclusions: I. Sobha was married to a lawyer.
II. Sobha was not married to a lawyer.

[Railway Recruitment]

5. Statements: All pencils are bricks.
All bricks are bottles.

Conclusions: I. All pencils are bottles.
II. All bricks are pencils.

[RBI Exam]

6. Statements: Some books are pencils.
Some pencils are pens.

Conclusions: I. Some books are pens.
II. Some pens are books.

[SBI PO]

7. Statements: All trays are erasers.
All pens are erasers.

Conclusions: I. All trays are pens.
II. Some pens are trays.

[BSRB Exam]

8. Statements: All birds are trees.
Some trees are hens.

Conclusions: I. Some birds are hens.
II. Some hens are trees.

9. Statements: Some cooks are lazy.
All boys are lazy.

Conclusions: I. Some boys are cooks.
II. Some cooks are boys.

[Bank PO]

10. Statements: Sohan is a good sportsmen.
Sportsmen are healthy.

Conclusions: I. All healthy person are sportsmen.
II. Sohan is healthy.

[Bank PO]

ANSWERS

1. (a) 2. (d) 3. (d) 4. (c) 5. (a) 6. (d) 7. (d) 8. (a) 9. (d) 10. (b)

Solutions and Hints

- Since both the statements are affirmative, the conclusion must be affirmative. Conclusion II cannot follow as it contains the middle term. So, only conclusion I follows.
- Since both the premises are particular, no conclusion follows.
- The first premise, being an A type proposition distributes subject only. So middle term 'trucks' forming the predicate is not distributed.
The second premise, being an I type proposition distributes neither the subject nor the predicate. So, the middle term 'trucks' forming the subject is not distributed.
- The data does not mention whether all fair girls were married to lawyers. So, either of the two conclusions may follow.
- Since both the premises are affirmative, the conclusion must be affirmative and only conclusion I follows.
- Since, both the premises are particular, no conclusion follows.
- Both the premises are A type propositions. So, in either, the middle term 'erasers' forming the predicate is not distributed.
Since the middle term is not distributed at least once in the premises, no conclusion follows.

8. Since one premise is particular, the conclusion must be particular. Conclusion II cannot follow as it contains the middle term. So only conclusion I follows.
9. The first premise is an I type proposition and distributes neither the subject nor the predicate. So the middle term 'lazy' forming the predicate is not distributed.
The second premise is an A type proposition and distribute subject only. So, the middle term 'lazy' forming the predicate is not distributed. Since the middle term is not distributed at least once in the premises, no conclusion follows.
10. Conclusion I cannot follow as it contains the middle term. So only conclusion II follows.

TWO-PREMISE ARGUMENTS (b) WITH MORE THAN TWO CONCLUSIONS

In these type of questions, two statements called *premises* are given followed by four *conclusions*. The candidate has to find out which of the conclusions follow from the given premises. First the given statements are analysed. If the middle term is not distributed at least once, no conclusion follows. No conclusion follows when

- (i) both the premises are particular.
- (ii) both the premises are negative.

EXAMPLE 1

Statements: Some mangoes are apples.
Some apples are lemons.

Conclusions: I. No mango is lemon.
II. All apples are lemons.
III. Some lemons are mangoes
IV. No apple is mango.

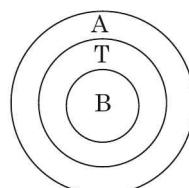
Solution Since both the premises are particular, (i.e. of type 'Some S is P'), no conclusion follows.

EXAMPLE 2

Statements: All birds are tigers.
All tigers are animals.

Conclusions: I. All birds are animals.
II. Some tigers are birds.
III. Some animals are birds.
IV. Some animals are tigers.

Solution Region for birds 'B' lies entirely within the region for animals 'A'. So conclusion I follows. Since T has a common area with B, A has a common area with B and A has a common area with T, conclusions II, III and IV follow. Thus all the conclusions follow.



EXAMPLE 3

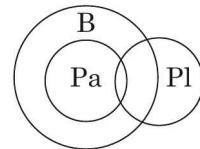
Statements: All books are papers.
Some papers are pencils.

Conclusions: I. All pencils are papers.
II. All pencils are books.

- III. Some books are pencils.
 - IV. No book is pencil.

Solution Clearly, the middle term is ‘Papers’ denoted by ‘Pa’.

The first premise is an A type proposition which distributes subject only. So the middle term 'Papers', forming the predicate is not distributed. The second premise is an I type proposition and distributes neither the subject nor the predicate. So, the middle term 'Papers', forming the subject is not distributed. Since the middle term is not distributed at least once in the premises, no conclusion follows.



EXERCISES

Directions (Q.1 to 5): In each question below are given two statements followed by four conclusions numbered I, II, III and IV. You have to consider the given statements to be true even if they seem to be at variance from the commonly known facts. Then decide which of the given conclusion logically follow from the given two statements, disregarding the commonly known facts.

1. Statements: Some teachers are students
All students are girls.

- Conclusions:

 - I. All teachers are girls.
 - II. Some girls are teachers.
 - III. Some girls are students.
 - IV. All students are teachers

[Bank PO]

- 2. Statements:** All soaps are clean.
All clean are wet.

- Conclusions:

 - I. Some clean are soaps.
 - II. No clean is soap.
 - III. Some wet are soaps.
 - IV. All wet are soaps.

[AFO Exam]

3. Statements: All typists are stenographers.
Some stenographers are boys.

- Conclusions: I. All boys are stenographers.
II. All boys are teachers.
III. Some teachers are boys.
IV. No teacher as boy.

[Bank PO]

Conclusions:

- I. Some blue are green.
- II. Some white are green.
- III. Some green are not white.
- IV. All white are green.

[AFO Exam]

5. Statements: All scientists are fools.
All fools are illiterate.

Conclusions:

- I. All scientists are illiterate.
- II. All illiterates are scientists.
- III. All illiterates are fools.
- IV. Some illiterates would be s

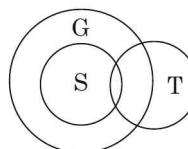
[UTI Exam]

ANSWERS

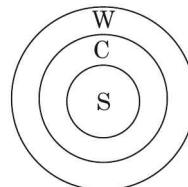
1. (d) 2. (d) 3. (e) 4. (d) 5. (a)

Solutions and Hints

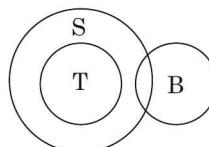
1. From the Venn diagram, it is clear that some girls are teachers and some girls are students, i.e. conclusions II and III follow. But conclusions I and IV cannot follow.



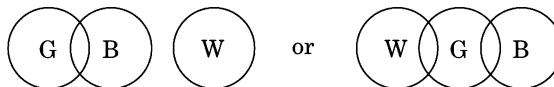
2. From the Venn diagram, C and S have a common area. So some clean are soaps. Similarly W and S have a common area. So some wet are soaps. Therefore, only conclusions I and III follow.



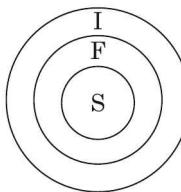
3. From the Venn diagram, none of the conclusions follow.



4. From the Venn diagram, conclusion I and III follow, i.e. ‘Some blue are green’ and ‘Some green are not white’



5. From the Venn diagram, area of scientists ‘S’ lie entirely within the area of illiterates ‘T’. So conclusion I follows. The area ‘T’ does not lie completely within ‘S’ or ‘F’. Therefore, conclusion II and III cannot follow. But illiterates and scientists have a common area. So conclusion IV follows. Therefore, only conclusion I and IV follow.



TYPE 2: THREE-PREMISE ARGUMENTS: Here, you are given three premises, containing four terms in all, followed by three or four conclusions. In such type of questions, first check for the converse of each of the premises amongst the given conclusions. Then apply the rules of syllogism to the given premises taking two inter-related premises at a time. Then use the conclusion so derived as a premise together with another premise to infer yet another conclusion.

Directions: In each of the following questions, three statements are given followed by four conclusions numbered I, II, III and IV. You have to take the given statements to be true even if they seem to be at variance with commonly known facts and then decide which of the given conclusions logically follow from the given statements disregarding the commonly known facts.

EXAMPLE 1

Statements: Some flowers are rods.

Some rods are doors. Some doors are houses.

Conclusions: I. Some houses are flowers.

II. Some doors are flowers.

III. Some flowers are doors.

IV. No house is flower.

(a) Either I or II follows

(b) Either I or IV follows

(c) Only II and III follow

(d) Only I and IV follow

(e) None of these

[SBI PO]

Solution Each combination of premises shall contain two particular premises and as such no definite conclusion follows.

Here, I and IV are contradictory statements involving only the extreme terms and none of the middle term ‘rods’ or ‘doors’. Thus they form a complementary pair. So either I or IV follows.

Hence, the answer is (b).

EXAMPLE 2

Statements: All buildings are rains. All papers are buildings. All dogs are papers.

Conclusions: I. All dogs are rains.

II. Some papers are rains.

III. Some rains are buildings

IV. Some rains are papers.

(a) Only I and II follow

(b) Only II and III follow

(c) Only I, II and III follow

(d) All follow

(e) None of these

[Bank PO]

Solution Conclusion III is the converse of first premise and so it holds.

All papers are buildings. All buildings are rains.

Since both the premises are universal and affirmative, the conclusion must also be universal and affirmative and should not contain the middle term. Therefore, it follows that 'All papers are rains' and IV is the converse of this conclusion and so it holds.

All dogs are papers. All papers are buildings.

Clearly it follows that 'All dogs are buildings'.

All dogs are buildings. All buildings are rains.

Clearly it follows that 'All dogs are rains' and so conclusion I follows. Hence I, III and IV follow from the given premises.

Hence, the answer is (e).

EXAMPLE 3

Statements: Some fruits are flowers.

No flower is a boat.

All boats are rivers.

Conclusions: I. Some fruits are rivers.

II. Some rivers are boats.

III. Some rivers are fruits.

IV. Some flowers are fruits.

(a) Only I and III follow

(b) Only II and III follow

(c) Only II and IV follow

(d) All follow

(e) None of these

[SBI PO]

Solution IV is the converse of first premise and so it holds.

II is the converse of third premise and so it holds.

Some fruits are flowers. No flower is a boat

Since one premise is particular and one negative, conclusion must be particular and negative and should not contain the middle term. So it follows that 'Some fruits are not boats'.

No flower is a boat. All boats are rivers.

Since the middle term is distributed twice, the conclusion cannot be universal. Again, since one premise is negative, the conclusion must be negative and shouldn't contain the middle term. Therefore, it follows that 'Some flowers are not rivers'.

Therefore, only II and IV follow.

Hence, the answer is (c).

EXERCISES

Directions (Q.1 to 5): In each of the following questions, three statements are followed by three conclusions numbered I, II and III. You have to take the given statements to be true even if they seem to be at variance from the commonly known facts. You have to decide which of the given conclusions logically follow from the given statements disregarding the commonly known facts.

1. Statements: Some blades are hammers.
Some hammers are knives.
Some knives are axes.

- Conclusions:** I. Some axes are hammers.
II. Some knives are blades.
III. Some axes are blades.

[Bank PO]

- 2. Statements:** All dolls are windows.

- All bottles are windows.
All cars are bottles.

- Conclusions: I. All cars are windows.
II. Some cars are dolls.
III. Some windows are cars.

[Bank PO]

3. Statements: Some hills are rivers.
Some rivers are deserts.
All deserts are roads.

- Conclusions: I. Some roads are rivers.
II. Some roads are hills.
III. Some deserts are hills

[Bank PO]

4. Statements: All fruits are vegetables.
All pens are vegetables.
All vegetables are rains.

- Conclusions: I. All fruits are rains.
II. All pens are rains.
III. Some rains are vegetables.

[Bank PO]

5. Statements: All dogs are fruits.
No chair is fruit.
Some chairs are clowns.

Conclusions:

- I. Some clowns are dogs.
- II. Some chairs are dogs.
- III. No chair is dog.
- IV. No dog is clown.

- (a) Either I or IV follows
- (b) Either I or IV and III follow
- (c) Either I or IV and II follow
- (d) Either II or III follows and either I or IV follows.

[SBI PO]

Directions (Q. 6): In the following question, select one alternative in which the third statement is implied by the first two statements.

6. (a) All dogs are mad. All sick persons are mad. So, all sick persons are dogs.
 (b) All oranges are black. All figs are oranges. So, all figs are black.
 (c) All windows are dogs. Some doors are dogs. So, all windows are doors.
 (d) No man can fly. No kite can fly. So, all men are kites.

Directions (Q. 7 to 10): Each question given below has a set of three or four arguments. Each set of statements is further divided into three segments. Choose the alternative when the third segment in the statement can be logically deduced using both the preceding two, but not just from one of them.

7. (A) All good people are knights. All warriors are good people. All knights are warriors.
 (B) No footballers are ministers. All footballers are tough. Some ministers are players.
 (C) All pizzas are snacks. Some meals are pizzas. Some meals are snacks.
 (D) Some students are boys. All students are girls. Some girls are boys.
 (a) A only (b) B and C (c) C only (d) C and D [CAT]
8. (A) All beautiful things are sad. She is beautiful. She is sad.
 (B) All nice things are flat. TVs are flat. TVs are nice things.
 (C) Potatoes are stems. All stems are fruits. Potatoes are fruits.
 (a) A only (b) A and B (c) C only (d) A and C [MAT]
9. (A) P is an artist. Some artists are pretty. P is pretty.
 (B) All actors are brave. Some men are actors. Some men are brave.
 (C) All actors are pretty. P is not an actor. P is not pretty.
 (D) Some men are employees. All employees are efficient. Some efficient people are employees.
 (a) A only (b) B and D (c) B only (d) C only
10. (A) Ravens are black. Ravens are evil. All evil are black.
 (B) Horses are faster than eagles. All eagles are hawks. Horses are faster than hawks.
 (C) No priest is a saint. Peter is a priest. Peter is a saint.
 (a) A only (b) B only (c) C only (d) None of these. [MAT]

ANSWERS

1. (d) 2. (c) 3. (a) 4. (d) 5. (b) 6. (b) 7. (c) 8. (c) 9. (c) 10. (b)

Solutions and Hints

1. Clearly each combination of premises shall contain two particular premises and as such no definite conclusion follows. Here,

Some blades are hammers. Some hammers are knives.

Since both the premises are particular, conclusion must be particular and should not contain the middle term 'hammers'. So, it follows that 'Some blades are knives'.

Some blades are knives. Some knives are axes

Since both the premises are particular, conclusion must be particular and should not contain the middle term 'knives'. So, it follows that 'Some blades are axes'. From the given conclusions, none of them follows.

Hence, the answer is (d).

2. *All cars are bottles. All bottles are windows.*

Clearly it follows that 'All cars are windows'. Therefore conclusion I follows.

Conclusion III is the converse of I. So III follows.

Thus only I and III follows.

Hence, the answer is (c).

3. *Some hills are rivers. Some rivers are deserts*

Since both the premises are particular, no definite conclusion follows.

Some rivers are deserts. All deserts are roads

Since one premise is particular, conclusion should be particular and should not contain the middle term. So it follows that 'Some rivers are roads'. I is the converse of this conclusion. So I follows.

Hence, the answer is (a).

4. *All fruits are vegetables. All vegetables are rains*

Since both the premises are universal and affirmative, the conclusion must also be universal and affirmative and should not contain the middle term. Therefore, it follows that 'All fruits are rains'. So I follows.

All pens are vegetables. All vegetables are rains.

Since both the premises are universal and affirmative, the conclusion must also be universal and affirmative and should not contain the middle term. Therefore, it follows that 'All pens are rains'. So II follows. Conclusion III is the converse of the third premise and so it holds. So III follows.

Hence, the answer is (d).

5. *All dogs are fruits. No chair is fruit.*

Since one premise is negative, conclusion must be negative. Since both the premises are universal, the conclusion must be universal. Therefore, it follows that 'No dog is chair', which is the converse of this conclusion and so it holds. Hence III follows.

No dog is chair. Some chairs are clowns.

Since one premise is negative and one particular, conclusion must be particular and negative. Therefore it follows that 'Some dogs are not clowns'. I and IV involves only the extreme terms and not the middle term 'chairs' and form complementary pair. So either I or IV follows.

Hence, the answer is (b).

6. Only the statement (b) in which third statement is implied by first two statements.

Hence, answer is (b).

7. Only the statement (c) in which third segment can be logically deduced from the first two segments. i.e. All pizzas are snacks. Some meals are Pizzas.

Hence, the answer is (c).

8. Only the statement (c) in which third segment can be logically deduced from the first two segments.

i.e., Potatoes are stems.

All stems are fruits.

Potatoes are fruits.

Hence, answer is (c).

9. Only statement (c) in which third segment can be logically deduced from the first two segment.
i.e., All actors are pretty.

P is not an actor.

P is not pretty.

Hence answer is (c).

10. Only statement (b) in which third segment can be logically deduced from the first two segment.
i.e., Horses are faster than eagles.

All eagles are hawks.

Horses are faster than hawks.

Hence, answer is (b).

Statements and Arguments

In this type of questions, a statement is given and two arguments for or against or both follow. Analyse the statement first and then decide which of the given arguments is strong with respect to the statement.

If argument I is strong, then answer (a); if argument II is strong, then answer (b); if either of the arguments I or II is strong then answer (c); if none of the arguments I or II is strong, then answer (d) and if both the arguments I and II are strong, then answer (e).

EXAMPLE 1

Statement: Should colleges be given the status of a university in India?

- Arguments:
- I. Yes. Colleges are in a better position to assess the students' performance and therefore the degrees will be more valid.
 - II. No. It is utopian to think that there will not be nepotism and corruption in awarding degrees by colleges.

Solution At the college level, all the students are assessed according to their performance in the university exams and not on the basis of any criteria of a more intimate dealing with the students. So, argument I is vague. At this level, the awarding of degrees is impartial and simply based on his performance. So, argument II also does not hold. So, the answer is (d).

EXAMPLE 2

Statement: Should government jobs in rural areas have more incentives?

- Arguments:
- I. Yes. Incentives are essential for attracting government servants there.
 - II. No. Rural areas are already cheaper, healthier and less complex than urban areas. So, why offer extra incentives?

Solution Government jobs in rural areas are having several difficulties as mentioned in the statement. In lieu of these, extra incentives are needed. So only argument I is strong. So the answer is (a).

EXAMPLE 3

Statement: Should computers be used in all possible sectors in India?

Arguments: I. Yes. It will bring efficiency and accuracy in the work.

II. No. It will be an injustice to the monumental human resources which are at present underutilised.

Solution It is clear that underutilised human resources have to be put together for better use. Computers with better and speedy efficiency can accomplish this. So, only argument I is strong. So the answer is (a).

EXERCISES

1. Statement: Should all news be controlled by government in a democracy?

[Bank PO]

Arguments: I. Yes. A variety of news only confuses people.

II. No. The controlled news loses credibility.

2. Statement: Should higher education be completely stopped for sometime?

[Bank PO]

Arguments: I. No. It will hamper the country's future progress.

II. Yes. It will reduce the educated unemployment.

3. Statement: Should workers be allowed to participate in the management of factories in India?

[Bank PO]

Arguments: I. Yes. It is the present management theory.

II. No. Many workers are illiterate and so their contributions will not be of any value.

4. Statement: Should the private sector be permitted to operate telephone services?

[Bank PO]

Arguments: I. Yes. They are operated in advanced western countries.

II. No. It is risky to put them in private hands.

5. Statement: Should new big industries be started in Bombay?

[Bank PO]

Arguments: I. Yes. It will create new job opportunities.

II. No. It will further add to the pollution of the city.

6. Statement: Should India manufacture atom bombs?

[Bank PO]

Arguments: I. Yes. It is imperative to protect the sovereignty and integrity of the country.

II. No. This will create imbalance in the power of nations in this region.

7. Statement: Should non-vegetarian food be totally banned in our country?

[Bank PO]

Arguments: I. Yes. It is expensive and therefore it is beyond the means of most people in our country.

II. No. Nothing should be banned in a democratic country like ours.

8. Statement: Should luxury hotels be banned in India?

[Bank PO]

Arguments: I. Yes. They are places from where international criminals operate.

II. No. Affluent foreign tourists will have no place to stay.

9. Statement: Should adult education programme be given priority over compulsory education programmes?

[Bank PO]

- Arguments: I. No. It will also help in success of compulsory education programme.
II. Yes. It will help to eliminate the adult illiteracy.
10. Statement: Should India go in for computerisation in industry? [Bank PO]
- Arguments: I. I. No. Computerisation demands a lot of money. We should not waste money on it.
II. Yes. When advanced countries are introducing computers in various areas, how can India afford to lag behind?
11. Statement: Should telecasting feature films be stopped? [UTI Exam]
- Arguments: I. Yes. Young children are misguided by the feature films.
II. No. This is the only way to educate the masses.
12. Statement: Should all the remote parts of a country be connected by road? [RBI Exam]
- Arguments: I. No. It will disturb peaceful simple life of the villagers.
II. Yes. It must be done immediately.
13. Statement: Should there be only one university throughout India? [UTI Exam]
- Arguments: I. Yes. This is the only way to bring about uniformity in the educational standards.
II. No. This is administratively impossible.
14. Statement: Should election expenses to central and state legislatures be met by the government. [AAO Exam]
- Arguments: I. Yes. It will put an end to political corruption.
II. No. It is not good in any country.
15. Statement: Should fashionable dresses be banned? [AAO Exam]
- Arguments: I. Yes. Fashions keep changing and hence consumption of cloth increases.
II. No. Fashionable clothes are a person's self expression and therefore his/her fundamental right.
16. Statement: Should political parties be banned? [AAO Exam]
- Arguments: I. Yes. It is necessary to teach a lesson to the politicians.
II. No. It will lead to an end of democracy.
17. Statement: Should a total ban be put on trapping wild animals? [AAO Exam]
- Arguments: I. Yes. Trappers are making a lot of money.
II. No. Bans on hunting and trapping are not effective.
18. Statement: Should the illiterate be debarred from voting?
- Arguments: I. Yes. They are easily misguided.
II. No. It is their constitutional right.
19. Statement: Should religion be taught in our schools?
- Arguments: I. No. Ours is a secular state.
II. Yes. Teaching religion helps inculcate moral values among children.
20. Statement: Should there be no place of interview in selection?
- Arguments: I. Yes. It is very subjective in assessment.
II. No. It is the only instrument to judge candidates motives and personality.
21. Statement: Should articles of only deserving authors be allowed to be published? [Bank PO]

- Arguments: I. Yes. It will save a lot of paper which is in short supply.
 II. No. It is not possible to draw a line between the deserving and the undeserving.
- 22. Statement:** Should India encourage exports, when most things are insufficient for internal use itself? **[Bank PO]**
- Arguments: I. Yes. We have to earn foreign exchange to pay for our imports.
 II. No. Even selective encouragement would lead to shortages.
- 23. Statement:** Should income tax be evaded by people? **[Bank PO]**
- Arguments: I. Yes. Taxes are excessively high.
 II. No. It is anti-national to do so.
- 24. Statement:** Should personal tax be abolished in India? **[Bank PO]**
- Arguments: I. Yes. It will motivate people to earn more.
 II. No. Individuals must learn to share their wealth with other people.
- 25. Statement:** Should India have no military force at all? **[Bank PO]**
- Arguments: I. No. Other countries in the world do not believe in non-violence.
 II. Yes. Many Indians believe in non-violence.
- 26. Statement:** Should selection tests be of the objective rather than of the descriptive type? **[Bank PO]**
- Arguments: I. Yes. The assessment of answers to objective type questions is fair and impartial.
 II. No. The descriptive type test is certainly a better tool than the objective type test.
- 27. Statement:** Should those who receive dowry, despite the law prohibiting it, be punished? **[Bank PO]**
- Arguments: I. Yes. Those who violate the law, must be punished.
 II. No. Dowry system is firmly rooted in the society since time immemorial.
- 28. Statement:** Should smoking be prohibited? **[BSRB Exam]**
- Arguments: I. Yes. It is wrong to smoke away millions of money.
 II. No. It will throw thousands of workers in the tobacco industry out of employment.
- 29. Statement:** Should taxes on colour television be further increased? **[AAO Exam]**
- Arguments: I. Yes. Colour television is a luxury item and only rich people buy them.
 II. No. Televisions are bought by the poor too.
- 30. Statement:** Should loyalty be the only criterion for promotion in any organisation? **[Officer's Grade]**
- Arguments: I. Yes. Without loyal men, no organisation can function.
 II. No. It leads to hypocrisy and partiality.

ANSWERS

- | | | | | | | | | | |
|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| 1. (b) | 2. (a) | 3. (b) | 4. (c) | 5. (e) | 6. (a) | 7. (b) | 8. (b) | 9. (b) | 10. (d) |
| 11. (d) | 12. (b) | 13. (b) | 14. (a) | 15. (b) | 16. (d) | 17. (d) | 18. (b) | 19. (b) | 20. (a) |
| 21. (b) | 22. (a) | 23. (b) | 24. (d) | 25. (d) | 26. (a) | 27. (a) | 28. (d) | 29. (d) | 30. (d) |

Explanations

1. A variety of news helps people to develop their own news. So argument I is strong. The controlled news shall be partial. So it loses credibility. Thus argument II is strong.
2. Higher education is not the cause of unemployment. In fact, it has created greater job opportunities. So argument II is vague. Besides higher education promotes the country's development. So argument I is strong.
3. The argument I in support does not provide a valid reason for the pursuance of the policy. So it is vague. Argument II provides a valid reason that illiterate workers will create wastefulness in management. So only argument II is strong.
4. In a developing country, a policy cannot be followed merely on the pretext that it is pursued in the western countries. So argument I does not hold good. Putting telephone services in private hands may even bring out greater efficiency. So, argument II is also vague.
5. With big industries, pollution is always a problem. But it is having some advantage as there are more openings in the field of employment. So, both the arguments are strong.
6. For attaining nuclear power, manufacture of atom bombs is an inevitability to protect the country from the threat of nuclear power. So, argument I is strong. Argument II against the statement is, however, weak.
7. Restriction on the diet of people will be denying them from their basic human rights. So, only argument II holds.
8. Luxury hotels are a mark of country's standard and a place for staying the affluent foreign tourists. So, argument II is strong. Ban on hotels is not a way to end the success of international criminals. So argument I is weak.
9. Argument I gives a reason in support of the statement and so it is not strong. The adult education programme needs to be given priority because it shall eliminate adult illiteracy and thus help in further spread of education. So argument II is strong.
10. Development in a new field is not a matter of merely following other countries. So, argument II is not strong. Computerisation is a much beneficial project and investment in it is not at all a waste. So argument I is also not strong enough.
11. Argument I is not strong because films also educate masses. Similarly, argument II against the statement is weak because it is not the only way to educate the masses.
12. Connecting remote parts by roads will only help the people there. So, argument II alone holds strong.
13. To bring uniformity in educational standards, we can have many universities all following same curricular and policies under one board. But one university throughout the country makes impossible the management of education. So, argument II is strong.
14. The policy will end political corruption to extract these amounts. The second argument is vague. So only argument I is strong.
15. Imposing ban on fashionable dresses will be a restriction on the personal choice and hence the right to freedom of an individual. So, only argument II is strong.
16. The ban on political parties, candidates can independently contest elections. So, it will not end democracy. So, argument II is not strong. Argument I does not give a strong reason.
17. Ban is necessary to protect our natural environment. So, none of the arguments is strong enough.
18. Argument I is not strong as no one can be debarred from their constitutional right even if they cannot practise it. In the same context argument II is strong.
19. Ours is a secular state does not mean that religion and religious values are to be eradicated. These inculcate moral values. So, argument I is vague and only argument II is strong.

20. Besides interview, there can be written examination to judge candidate's motives. So, the second argument is not strong enough. However, interview is a subjective assessment. So argument I is strong.
21. The first argument is not a strong reason in support of the statement. It is not possible to analyse the really deserving and not deserving. So argument II is strong.
22. India can export only the surplus and those which can be saved from the luxury needs to pay for its import. Encouragement to export cannot lead to shortages as it shall provide the resources for imports. So, only argument I is strong.
23. Income tax taken from the people is utilised for the welfare of the people. So it will be anti-national on their part to evade taxes. Thus, only argument II is strong.
24. Abolishing the tax will increase the people's income and make them passive. So, argument I is vague. The personal tax is no way of sharing wealth with other people. So, argument II also does not hold.
25. India needs to have military force to defend itself against the threat of other military powers in the world. So, both the arguments are weak.
26. Judgement being subjective tests depends on the individual who judges while that in objective tests is fair and impartial. So, argument I is strong and argument II is weak.
27. Laws are made to ensure that no person pursues the practice. So, person, who violate the laws, is to be punished. So, argument I is strong. Even though wrong practice is firmly rooted, it should be ended. So, argument II is not strong.
28. Smoking is to be abolished as it is injurious to health and not only to save money. So argument I is vague. To provide employment one cannot continue a hazardous task. So, argument II is also vague.
29. The colour television that has now become more of a means of entertainment and television is bought by all those who can afford it and not only by rich. So, argument I is vague. Poor people cannot buy televisions. So, argument II is not strong.
30. The argument in support of the statement is vague. When loyalty is considered, hypocrisy does not matter much as the fact that efficiency is neglected. So, the arguments are not strong enough.

Statements and Assumptions

An assumption is something that can be supposed on considering a given statement.

Generally, a statement is given, followed by two assumptions. You have to assess the given statement and then decide which of the given assumptions is implicit in the statement and choose the correct alternative provided.

Directions: In the questions of the type, a statement is given followed by two assumptions numbered I and II. You have to consider the statement and decide which of the given assumptions is implicit.

Give answer (a) if only assumption I is implicit; (b) if only assumption II is implicit; (c) if either I or II is implicit; (d) if neither I nor II is implicit and (e) if both I and II are implicit.

EXAMPLE 1

Statement : A good book, even if costly is sold.

Assumptions : I. Some books are better than others.

II. Most of the books are costly.

Solution Statement mentions a ‘good’ book. This means some books may not be good. So assumption I is implicit. The words ‘if costly’ show that most books are not costly. So assumption II is not implicit. Hence the answer is (a).

EXAMPLE 2

Statement : “You must learn to refer the dictionary if you want to become a good writer”—A advises B.

Assumptions : I. Only writers refer to the dictionary.

II. All writers good or bad refer to the dictionary.

Solution It does not follow from the statement that only writers and nobody else refer to the dictionary. Nothing is mentioned about the bad writers. So, both the assumptions I and II are not implicit and therefore the answer is (d).

EXAMPLE 3

Statement : "All are cordially invited to attend the entertainment programme. It is free"—An announcement in a newspaper.

Assumptions : I. A negligible number of readers read announcements in a newspaper.
II. People generally do not go to entertainment programme which are free.

Solution Nothing is mentioned in the statement about the number of people who read announcements or whether people do or do not go to free entertainment. Hence, the answer is (d).

EXERCISES

Directions: In the following question given a statement is followed by two assumptions numbered I and II. An assumption is something supposed or taken for granted. You have to consider the statement and the following assumptions and decide which of the assumption is implicit in the statement.

Give answer (a) if only assumption I is implicit; (b) if only assumption II is implicit; (c) if either I or II is implicit; (d) if neither I nor II implicit and (e) if both I and II are implicit.

1. Statement : The boy is too honest to speak the truth.

Assumptions : I. Very honest boys also tell lies.
II. Dishonest boys also speak the truth.

2. Statement : Of all the radio sets manufactured in India, the 'X' brand has the largest sale.

Assumptions : I. The sale of all the radio sets manufactured in India is known.
II. The manufacturing of no other radio set in India is as large as 'X' brand radio.

3. Statement : Warning: Cigarette smoking is injurious to health. **[Bank PO]**

Assumptions : I. Non-smoking promotes health.
II. Really, this warning is not necessary.

4. Statement : The next meeting of the Governing Board of the Institute will be held after one year. **[Bank PO]**

Assumptions : I. The Institute will remain in function after one year.
II. The Governing Board will be dissolved after one year.

5. Statement : Let us change the eligibility criteria to reduce the number of applicants. **[RBI Exam]**

Assumptions : I. The present eligibility criteria is very low.
II. A large number of applications are not desirable.

6. Statement : The integrated steel plants in India would no longer have to depend on imports for continuous casting refractories. **[Bank PO]**

Assumptions : I. Continuous casting refractories are needed by India.
II. Continuous casting refractories are in demand.

7. Statement : A sentence in the letter to the candidates called for written examination. "You have to bear your expenses on travel etc." **[SBI PO]**

Assumptions : I. If not clarified all the candidates may claim reimbursement of expenses.
II. Many organisations reimburse expenses on travel to candidate called for written examination.

8. Statement : It is through participative management policy alone that indiscipline in our industries can be contained and a quality of life ensured to the worker. [SBI PO]
- Assumptions : I. Quality of life in our industry is better.
II. Indiscipline results in poor quality of life.
9. Statement : "Blue tie would help us identify our staff from others"—A suggestion in a company. [Bank PO]
- Assumptions : I. The company needs to identify its staff.
II. Blue tie is the latest fashion.
10. Statement : "A car is required on rent"—An advertisement. [Bank PO]
- Assumptions : I. All types of vehicles are available on rent.
II. People will respond to the advertisement.
11. Statement : Read this notice before entering the club.
- Assumptions : I. People are literate.
II. No blind person comes to the club.
12. Statement : Postal rates have been increased to meet the deficit.
- Assumptions : I. The present rates are very low.
II. If the rates are not increased the deficit cannot be met.
13. Statement : "Present day education is in shambles and the country is going to the dogs". [AEO]
- Assumptions : I. A good education system is essential for the well being of a nation.
II. A good education alone is sufficient for the well being of a nation.
14. Statement : "Computer education should start at schools itself".
- Assumptions : I. Learning computers is easy.
II. Computer education fetches jobs easily.
15. Statement : The new education policy envisages major modifications in the education system.
- Assumptions : I. The present education system is inconsistent with national needs.
II. The present education system needs change.
16. Statement : "Do not lean out of the door of the bus"—A warning in a school bus.
- Assumptions : I. Leaning out of a running bus is dangerous.
II. Children do not pay any heed to such warnings.
17. Statement : Be humble even after being victorious.
- Assumptions : I. Many people are humble after being victorious.
II. Generally, people are not humble.
18. Statement : Opening a library in Rambli will be a wastage.
- Assumptions : I. Inhabitants of Rambli are illiterate.
II. Inhabitants of Rambli are not interested in reading.
19. Statement : Films have become indispensable for the entertainment of people.
- Assumptions : I. Films are the only media of entertainment.
II. People enjoy films.
20. Statement : Children are influenced more by their teachers now-a-days.
- Assumptions : I. The children consider teachers as their models.
II. A large amount of children's time is spent in school.

- 21.** Statement : “In order to bring punctuality in our office, we must provide conveyance allowance to our employees”—Incharge of a company tells Personnel Manager. **[Bank PO]**
- Assumptions : I. Conveyance allowance will not help in bringing punctuality.
II. Discipline and reward should always go hand in hand.
- 22.** Statement : A warning in a train compartment—“To stop train, pull chain. Penalty for improper use ₹ 500”.
- Assumptions : I. Some people misuse the alarm chain.
II. On certain occasions, people may want to stop a running train.
- 23.** Statement : “You should not grant him leave in this week due to exigency of work”—A supervisor advises the administrative officer. **[Officer's Grade]**
- Assumptions : I. Request for leave can be turned down also.
II. The supervisor has reviewed the work required to be done during the said period.
- 24.** Statement : “We offer best training in the field of computers”—An advertisement. **[Bank PO]**
- Assumptions : I. People are interested in getting training in computers.
II. People want best training.
- 25.** Statement : “Use aluminium—The versatile metal for packaging”—An advertisement. **[Bank PO]**
- Assumptions : I. Aluminium is the only versatile metal.
II. Some companies use metallic packing.
- 26.** Statement : The president assured the people that elections will be held here after every five years. **[SBI PO]**
- Assumptions : I. People are afraid that the elections may not be held at all.
II. People are afraid that elections may not be held after five years.
- 27.** Statement : If it is easy to become an engineer, I don't want to be an engineer. **[SBI PO]**
- Assumptions : I. An individual aspires to be professional.
II. One desires to achieve a thing which is hard earned.
- 28.** Statement : You can hereby appointed as a programmer with a probation period of one year and your performance will be reviewed at the end of the period for confirmation”—A line in an appointment letter. **[Bank PO]**
- Assumptions : I. The performance of an individual generally is not known at the time of appointment offer.
II. Generally an individual tries to prove his worth in the probation period.
- 29.** Statement : Lock your valuables in a cupboard and call everybody gentleman. **[SBI PO]**
- Assumptions : I. Valuables locked in cupboard cannot be stolen.
II. Stealing is a crime.
- 30.** Statement : “Banking services are fine-tuned to meet growing business needs”—An advertisement. **[SBI PO]**
- Assumptions : I. Banking is a part of business activity.
II. Industrialists prefer better banking services.

- 31.** Statement : The successful man has the ability to judge himself correctly.
[AAO Exam]
 Assumptions : I. To judge others is of no use to a successful man.
 II. The successful man cannot make a wrong judgement.
- 32.** Statement : Television X—the neighbour's envy, the owner's pride—A TV advertisement.
[RBI Exam]
 Assumptions : I. People are envious of their neighbours superior possessions.
 II. People want to be envied by their neighbours.
- 33.** Statement : "The function will start at 3 PM. You are requested to take your seats before 3 PM"—Last sentence in an invitation card.
 Assumptions : I. If the invitee is not in his seat before 3 PM, the function will not start.
 II. Function will start as scheduled.
- 34.** Statement : If you have any problems, bring them to me.
 Assumptions : I. You have some problems.
 II. I can solve any problem.
- 35.** Statement : Vitamin E tablets keep your complexion in a glowing condition by improving circulation.
 Assumptions : I. People like a glowing complexion.
 II. Complexion becomes dull in the absence of circulation.
- 36.** Statement : "Ensure a good night's sleep for your family with safe and effective X mosquito coil"—An advertisement.
[UTI Exam]
 Assumptions : I. X mosquito coil is better than any other mosquito coil.
 II. A good night's sleep is desirable.
- 37.** Statement : All existing inequalities can be reduced, if not utterly eradicated by action of government or by revolutionary change of government.
[LIC]
 Assumptions : I. Inequality is a man-made phenomenon.
 II. No person would voluntarily part with what he possesses.
- 38.** Statement : The taste of food contributes to the intake of nourishment which is essential for the survival of human beings.
[Management Trainee's Exam]
 Assumptions : I. Human beings take food for the enjoyment of its taste.
 II. Human beings experience the taste of food.
- 39.** Statement : Every year doctors, scientists and engineers migrate from India to greener pastures.
[Income Tax and Central Excise]
 Assumptions : I. Brain drain has affected India adversely.
 II. Better scales and better standards of living act as a bait to lure them.
- 40.** Statement : The present examination system needs overhauling thoroughly.
[Investigator's Exam]
 Assumptions : I. The present examination system is obsolete.
 II. Overhauling results in improvement.

ANSWERS

- | | | | | | | | | | |
|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| 1. (d) | 2. (a) | 3. (d) | 4. (e) | 5. (d) | 6. (e) | 7. (e) | 8. (b) | 9. (a) | 10. (b) |
| 11. (e) | 12. (b) | 13. (e) | 14. (a) | 15. (e) | 16. (a) | 17. (d) | 18. (c) | 19. (b) | 20. (a) |
| 21. (b) | 22. (e) | 23. (e) | 24. (e) | 25. (e) | 26. (e) | 27. (b) | 28. (e) | 29. (a) | 30. (e) |
| 31. (e) | 32. (a) | 33. (b) | 34. (b) | 35. (e) | 36. (e) | 37. (a) | 38. (b) | 39. (d) | 40. (e) |

Explanations

1. The statement means that boy is so honest that he will definitely speak the truth. i.e. very honest boy will not tell lies. So assumption I is not implicit. The statement mentions nothing about dishonest boys. So, assumption II is not implicit.
2. Comparison could not be made without knowing the sale of all the radio sets. So assumption I is implicit. The statement mentions only that the sale is largest and nothing is mentioned about the manufacture. So, assumption II is not implicit.
3. The statement confirms that smoking affects health adversely and so non-smoking will keep the health as it is. Thus, assumption I is not implicit. The warning is necessary to tell the people that injury would be caused by smoking. So, assumption II is not implicit.
4. The meeting of the Governing Board will be held after one year means the institute will start functioning at that time. So, assumption I is implicit. The board cannot be dissolved at the time when its meeting starts. So, assumption II is implicit.
5. The statement shows that the eligibility criteria needs to be raised but not because they are very low but only to reduce the number of applicants. So, assumption I is not implicit. The statement does not mention anything about the worth of applicants. So, assumption II is also not implicit.
6. The statement mentions the self-sufficiency of India in continuous casting refractories. This means that they are needed in the country. So, assumption I is implicit. Since continuous casting refractories are needed in integrated steel plants, it means that they are in demand. So assumption II is implicit.
7. Not mentioning the condition may provoke all the candidates to demand their claim. So, assumption I is implicit. The condition is mentioned because some companies do reimburse the travel expenses. So, assumption II is also implicit.
8. The statement mentions that participative management policy will provide quality life to the workers. So, assumption I is not implicit. The statement mentions that participative management will contain the indiscipline and ensure quality life to workers. So, assumption II is implicit.
9. Here, the suggestion is given for providing a method of identification. This means that the staff needs to be identified. So assumption I is implicit. The statement does not mention anything about the fashion. So, assumption II is not implicit.
10. The advertisement clearly mentions that a car is required on rent. So, assumption I is not implicit. An advertisement is given for the people to respond it. So, assumption II is implicit.
11. The statement is meant for the people to read. So, it is assumed that the people are literate and assumption I is implicit. Since the notice is to be read by everyone entering the club, so it is assumed that no blind person comes to the club. Thus, assumption II is also implicit.
12. The statement shows that the present postal rates are not sufficient to meet the deficit but they may still be high. So, assumption I is not implicit. The rates are increased to meet the deficit. So, assumption II is implicit.
13. The statement mentions the degradation of the country with the disruption of the education system. So, assumption I is implicit. Clearly, from the statement it does not follow whether education alone is required or whether other things go with it for the well being of the nation. So assumption II is also implicit.
14. The computer education can be started at the school level only if it is easy. So, assumption I is implicit. In the statement nothing is mentioned about the link between the job and the computer education. So, assumption II is not implicit.

15. Modifications are made in the present education system finding that it was inconsistent with the needs and required to be changed. So, both the assumptions I and II are implicit.
16. The warning against leaning out of running bus is made to heed against the dangers involved. So, assumption I is implicit. The warning is meant to be heeded but nothing is mentioned whether children pay heed to it or not. So, assumption II is not implicit.
17. Nothing is mentioned about the nature of the people in the statement. It simply gives advice. So, both the assumptions I and II are not implicit.
18. A library will be a wastage only when the people of the place cannot read or they are not interested in reading. So, either of the assumptions I or II is implicit.
19. 'Films are indispensable' doesn't mean that they are the only means of entertainment. So, assumption I is not implicit. Assumption II follows the statement. So assumption II is implicit.
20. Children consider teachers as their model as they are more influenced by them. So, assumption I is implicit. It is not necessary that the children are influenced by teachers because they spend much time in school. So, assumption II is not implicit.
21. Assumption I is against the statement. So it is not implicit. The allowance will serve as a reward to the employees and shall provoke them to come on time. So, assumption II is implicit.
22. Penalty is imposed to prevent people from misusing the alarm chain. This means that some people misuse it. So, assumption I is implicit. The alarm chain is provided to stop the running train in case of emergency. So, assumption II is also implicit.
23. The advice is given to turn down the request for leave. So assumption I is implicit. The mention of the exigency of work makes assumption II implicit.
24. The advertisement is meant to cater to the people's demand of computer training. So, assumption I is implicit. The offer of 'best training' makes assumption II implicit.
25. 'Versatility' is mentioned as the special quality of aluminium. So, assumption I is implicit. The advertisement is meant for those who use metallic packing. So, assumption II is also implicit.
26. The statement is made to eliminate the fear of the people that the elections may not be held at all or they may not be held after five years. So, both assumptions I and II are implicit.
27. Nothing is mentioned about the professional nature of the job. So, assumption I is not implicit. From the statement, it is clear that one rejects a thing that is easy to achieve. So, assumption II is implicit.
28. The performance of the individual has to be tested over a span of time as the statement mentions. So, assumption I is implicit. The statement mentions that the individual's worth shall be reviewed before confirmation. So assumption II is also implicit.
29. The statement points out that a person who keeps his things locked away shall feel that every person is good because he has no danger for his things. So, assumption I is implicit. The statement mentions nothing about the lawful nature of the act of stealing. So, assumption II is not implicit.
30. According to the statement, banking is connected to business activity. So, assumption I is implicit. Banking is adjusted in a way to promote business needs. This means that business is promoted by better banking. So, assumption II is also implicit.
31. The basic quality of a successful man is that he can judge himself. This means that he need not judge others. So, assumption I is implicit. The word 'correctly' makes assumption II implicit.
32. The advertisement attacks the particular quality mentioned in the assumption. So, assumption I is implicit. The statement mentions that the thing shall be coveted because it shall be his superior possession. So, assumption II is not implicit.
33. In the statement, it is mentioned that the function will start at 3 PM and not that the invitees will be waited for. So, assumption I is not implicit and only assumption II is implicit.

34. The statement doesn't show that you have problems. So, assumption I is not implicit. The statement states that problems will be solved by 'me'. So, assumption II is implicit.
35. The advice is given for people who like glowing complexion. So, assumption I is implicit. Since complexion glows if circulation is improved. So, assumption II is also implicit.
36. The advertisement mentions the coil safe and effective pointing to the best qualities. So, assumption I is implicit. The advertisement is meant to enable people to have a good night's sleep. So, assumption II is also implicit.
37. Since inequality can be reduced, it means that it is not natural but created. So, assumption I is implicit. Nothing is mentioned about the people's response. So, assumption II is not implicit.
38. It is mentioned that nourishment is essential for survival. So, this is the basic cause of intake of food. Hence, assumption I is not implicit. Since taste of food affects the intake of nourishment, it means that human beings are affected by taste. So, assumption II is implicit.
39. Nothing is mentioned about the effect of migration on the country. So, assumption I is not implicit. Nothing is mentioned about the reason for the migration. So, assumption II is also not implicit.
40. 'Thorough' overhauling is needed only in case of an obsolete system. So, assumption I is implicit. Overhauling is done for improvement. So, assumption II is also implicit.

Statements and Course of Action

In such questions, a statement mentioning a particular problem is given and is followed by two courses of action numbered I and II. You have to analyse the statement and then decide which of the courses of action should be a step or decision taken for improvement, follow-up or further action in regard to the given statement. Everything in the statement is assumed to be true and logical courses of action should follow from it.

EXAMPLE 1

Statement : Many cases of cholera were reported from a nearby village.
Courses of action : I. The question should be raised in the Legislative Assembly.
II. A team of doctors should be rushed to the village.

Solution The disease has to be eradicated. For this proper and immediate medication and preventive measures by doctors are necessary. So only course II follows.

EXAMPLE 2

Statement : People residing in some remote tribal areas are far from education.
Courses of action : I. Schools for children and adults should be opened there.
II. Social workers should be entrusted with the job of educating them.

Solution Clearly, to make permanent arrangements for education in remote tribal areas, schools have to be opened in those areas. Education by social workers shall be a temporary remedy. So only course of action I follows.

EXAMPLE 3

Statement : The librarian finds some cases in which the pages from certain books issued from the library, are torn.
Courses of action : I. The librarian should keep a record of books issued to each student, and if the pages are found torn, strict measures should be taken against the student who had been issued that book.
II. Some funds should be collected from the students collectively to renovate the library.

Solution Clearly, precaution should be taken to catch the guilty person and punish him for the act. This alone will help curb the wrong practice. So, only course I will follow.

EXERCISES

Directions: In the following question a statement is followed by two courses of action numbered I and II. A course of action is a step or decision to be taken for improvement, follow-up, or further action in regard to the problem policy, etc. on the basis of the information given in the statement. You have to assume everything in the statement to be true, then decide which of the two given courses of actions logically follows for pursuing.

Give answer (a) if only I follows; (b) if only II follows; (c) if either I or II follows; (d) if neither I nor II follows; and (e) if both I and II follow.

1. Statement : A leading US multinational engineering and construction firm is keen to invest in India in a variety of sectors ranging from power to land management. [Bank PO]

Courses of action : I. Such multinational companies should not be allowed to operate in India.
II. India should encourage multinational companion from other developed countries to invest in the power sector to bring in competitive climate.

2. Statement : A shopkeeper was reported to be selling adulterated grains.

Courses of action : I. He should be fined and his shop sealed.
II. He should be asked to leave the town and open a shop elsewhere.

3. Statement : A train has derailed near a station while moving over a bridge and fell into the river.

Courses of action : I. The railway authorities should clarify the reason of the accident to the government.
II. The government should allocate funds to compensate the destruction caused.

4. Statement : The Central Bureau of Investigation receives the complaint of an officer taking bribe to do the duty he is supposed to.

Courses of action : I. The CBI should try to catch the officer red handed and then take a strict action against him.
II. The CBI should wait for some more complaints about the officer to be sure about the matter.

5. Statement : Most of the children in India are not able to get education, because they get employed to earn livelihood in their childhood only.

Courses of action : I. Education should be made compulsory for all children up to the age of 14.
II. Employment of children below the age of 14 years, should be banned.

6. Statement : The Finance Minister submits his resignation a month before the new budget is to be presented in the Parliament.

Courses of action : I. The resignation should be accepted and another person should be appointed as the Finance Minister.
II. The resignation should not be accepted.

7. Statement : Courts take too long in deciding important disputes of various departments.

Courses of action : I. Courts should be ordered to speed up matters.
II. Special powers should be granted to officers to settle disputes concerning their department.

8. Statement : A group of school students was reported to be enjoying at a picnic spot during school hours.
- Courses of action : I. The principal should contact the parents of those students and tell them about the incident with a real warning for future.
II. Some disciplinary action must be taken against those students and all other students should be made aware of it.
9. Statement : Footpaths of a busy road are crowded with vendors selling cheap items.
- Courses of action : I. The help of police should be sought to drive them away.
II. Some space should be provided to them where they can earn their bread without blocking the footpaths.
10. Statement : The sale of a particular product has gone down considerably causing great concern to the company.
- Courses of action : I. The company should make a proper study of rival products in the market.
II. The price of the product should be reduced and quality improved.
11. Statement : A recent study shows that children below five die in the cities of the developing countries mainly from diarrhoea and parasitic intestinal worms. [Bank PO]
- Courses of action : I. The government of developing countries should take adequate measures to improve the hygienic conditions in the cities.
II. Children below five years in the cities of the developing countries need to be kept under constant medication.
12. Statement : The Doordarshan is concerned about the quality of its programmes particularly in view of stiff competition it is facing from Star and other satellite TV channels and is contemplating various measures to attract talent for its programmes. [Bank PO]
- Courses of action : I. In an effort to attract talent, the Doordarshan has decided to revise its fee structure for the artists.
II. The fee structure should not be revised until other electronic media also revise it.
13. Statement : The Indian electronic component industry venturing into the West European markets faces tough competition from the Japanese.
- Courses of action : I. India should search for other international markets for its products.
II. India should improve the quality of the electronic components to compete with the Japanese in capturing these markets.
14. Statement : Exporters in the capital are alleging that commercial banks are violating the Reserve Bank of India directive to operate a post shipment export credit denominated in foreign currency at international interest rates from January this year. [Bank PO]
- Courses of action : I. The officers concerned in the commercial banks are to be suspended.
II. The RBI should be asked to stop giving such directives to commercial banks.
15. Statement : One of the problems facing the food processing industry is the irregular supply of raw material. The producers of raw material are not getting a reasonable price. [Bank PO]
- Courses of action : I. The government should regulate the supply of raw materials to other industries also.
II. The government should announce an attractive package to ensure regular supply of raw materials for food processing industry.

- 16.** Statement : India's performance in the recent Olympic Games was very poor. Not even a single medal could be bagged by the players. The government has spent ₹ 5 crores in training and deputing a team of players to participate in the Olympic Games. **[Bank PO]**
- Courses of action : I. India should stop sending players to the future Olympic Games.
II. Government should immediately set up an enquiry commission to find out the reason for India's dismal performance.
- 17.** Statement : The government will slap legally enforceable penalties on coal companies defaulting on quality and quantity of coal supplies to bulk consumers, especially to the thermal power station. **[Bank PO]**
- Courses of action : I. The requirement of coal for thermal power stations should be assessed realistically.
II. The coal companies should introduce welfare measures for their employees.
- 18.** Statement : Some serious blunders were detected in the accounts section of a factory.
- Courses of action : I. An efficient team of auditors should be appointed to check the accounts.
II. A show cause notice should be issued to all the employees involved in the irregularity.
- 19.** Statement : The police department has come under a cloud with recent revelations that at least two senior police officials are suspected to have been involved in the illegal sale of a large quantity of weapons from the state police armoury.
- Courses of action : I. A thorough investigation should be ordered by the state government to bring out all those who are involved into the illegal sale of arms.
II. State police armoury should be kept under central government's control.
- 20.** Statement : Orissa and Andhra Pradesh have agreed in principle to set up a joint control board for better control, management and productivity of several interstate multipurpose projects. **[Bank PO]**
- Courses of action : I. Other neighbouring states should setup such control boards.
II. The proposed control board should not be allowed to function as such joint boards are always ineffective.
- 21.** Statement : The committee has criticised the institute for the failure to implement a dozen of regular programmes despite an increase in the staff strength and not drawing up a firm action plan for studies and research. **[SBI PO]**
- Courses of action : I. The broad objectives of the institute should be redefined to implement a practical action plan.
II. The institute should give a report on reasons for not having implemented the planned programmes.

ANSWERS

1. (b) 2. (a) 3. (d) 4. (a) 5. (e) 6. (b) 7. (e) 8. (e) 9. (e) 10. (a)
 11. (e) 12. (a) 13. (b) 14. (d) 15. (b) 16. (b) 17. (d) 18. (a) 19. (a) 20. (a)
21. (e)

Explanations

1. Clearly, financing is the major problem in starting any project. The investment by multinational companies shall, therefore, be a way to development. So only II follows.
2. It is clear that if shopkeeper is allowed to continue without being punished, he would create the problem elsewhere. So only I follows.
3. It is necessary to take preventive measures so as to protect the passengers and pay them adequate compensation. So none of the two courses follows.
4. One complaint is enough for a wrong doing. This should be confirmed by catching the guilty one and then strict action is to be taken against him. So only course I follows.
5. To educate all children, enforcement of education is necessary. Also, the reason is that they are employed. So ban on such employment is also needed. Thus, both the courses follow.
6. The present finance minister shall know better all the plans and resources of the government and he alone can present a suitable budget. So course II should be followed.
7. For quick disposal of cases, either the matters in the court should be speeded up or the matters should be cleared up in their respective departments to prevent the delay. So both the courses follow.
8. Both warning and future prevention are necessary. So both the courses follow.
9. The footpaths are meant for an entirely different purpose. So, they need to be kept empty. For this, police help has to be sought. Also, the vendors cannot be deprived of a living. So, both the courses follow.
10. A study of rival products in the market will help assess the cause for the lowering down of the prices and then a suitable action will be taken. So only I follows.
11. The two diseases mentioned are caused by unhygienic conditions. So, improving the hygienic conditions is a step towards their eradication. Also, constant medication will help timely detection of the disease and hence a proper treatment. So both I and II follow.
12. The decision to revise its fee structure for artists is taken by Doordarshan as a remedy to the challenging problem that had arisen before it. It cannot wait till other media take action. So only course I follows.
13. An escapist attitude does not help much. The need is to compete and emerge successful. So, only course II follows.
14. The statement mentions that the commercial banks violate a directive issued by the RBI. The remedy is only to make the banks implement the act. So none of the courses follows.
15. In order to solve the problem of food industry, a regular supply of raw materials should be ensured. So course II shall follow.
16. To compete against a challenge, the first step must be to find out where the lackening is. So, only course II follows.
17. None of the courses of action is a suitable follow up of the government's act against defaulters. So, none of the courses of action follows.
18. Detect the blunder and its improvement is the urgent need. So, only course I follows.
19. Here the first course of action is suitable follow up of the problem.
20. The effectiveness of such control boards is established by the fact that Orissa and A.P. have agreed to it for better control of its multipurpose projects. So only course of action I follows.
21. The problem is that despite an increase in staff strength, the institute has failed in its objective of implementing its plan. So, either there should be reasons for the lack or the plans are a failure and must be revised for practical implementation. Thus, both the courses follow.

Statements and Conclusions

In this type of questions, one or more statements are given. You have to analyse the given statements, understand their indirect implications and then decide which of the given conclusion follows.

Directions: In each of the following questions, a statement is given followed by two conclusions I and II. Give answer (a) if only conclusion I follows; (b) if only conclusion II follows; (c) if either I or II follows; (d) if neither I nor II follows and (e) if both I and II follow.

EXAMPLE 1

Statement : The distance of 900 km by road between Bombay and Jafra will be reduced to 280 km by sea. This will lead to a saving of ₹ 7.92 crores per annum on fuel.

Conclusions : I. Transportation by sea is cheaper than that by road.
II. Fuel must be saved to the greatest extent.

Solution According to the statement, the sea transport is cheaper than the road transport in the case of route from Bombay to Jafra, not in all the cases. So, conclusion I does not follow. The statement stresses on the saving of fuel. So, conclusion II follows. Hence, the answer is (b).

EXAMPLE 2

Statement : Sealed tenders are invited from competent contractors experienced in executing construction jobs.

Conclusions : I. Tenders are invited only from experienced contractors.
II. It is difficult to find competent tenderers in construction jobs.

Solution According to the statement, tenders are invited from contractors experienced in executing construction jobs. So, conclusion I follows. The availability (c) of competent tenderers in construction is not mentioned. So, conclusion II does not follow. Hence the answer is (a).

EXAMPLE 3

Statement : Any young man who makes dowry as a condition for marriage discredits himself and dishonours womanhood.

Conclusions : I. Those who take dowry should be condemned by society.
II. Those who do not take dowry respect womanhood.

Solution Clearly, the statement declares dowry as an evil practice and reflects its demerits. Thus, conclusion I follows. Also, it is given that those who take dowry, dishonour womanhood. This implies that those who do not take dowry respect womanhood. So, conclusion II follows. Hence the answer is (e).

EXERCISES

Directions: In each question below are given certain statements followed by some conclusions. Choose the conclusion which follows from the given statements.

1. Statements:

1. None but the rich can afford air-travel.
2. Some of those who travel by air become sick.
3. Some of those who become sick require treatment.

Conclusions:

- (a) All the rich persons travel by air.
- (b) Those who travel by air become sick.
- (c) All the rich persons become sick.
- (d) All those who travel by air are rich.

2. Statements:

1. Only students can participate in the race.
2. Some participants in the race are females.
3. All female participants in the race are invited for coaching.

Conclusions:

- (a) All participants in the race are invited for coaching.
- (b) All participants in the race are males.
- (c) All students are invited for coaching.
- (d) All participants in the race are students.

3. Statements:

1. A forest has as many sandal trees as it has Ashoka trees.
2. Three-fourths of the trees are old one and half of the trees are at the flowering stage.

Conclusions:

- (a) All Ashoka trees are at the flowering stage.
- (b) All sandal trees are at the flowering stage.
- (c) At least one-half of the Ashoka trees are old.
- (d) One-half of the sandal trees are at the flowering stage.
- (e) None of these.

4. Statements:

1. Shyam is not the father of Hari.
2. Hari is the son of Suresh.
3. Suresh has three sons.

Conclusions:

- (a) Shyam is son of Suresh.
- (b) Hari is the brother of Shyam.
- (c) Suresh is the father of Hari.
- (d) Shyam has no children.

[Railways]

Directions: In each of the following questions, a statement is followed by two conclusions. Give answer (a) if the conclusion I follows; (b) if conclusion II follows; (c) if both I and II follow; (d) if either I or II follows; and (e) if neither I nor II follows.

- 5. Statement :** Of all the television sets manufactured in India, is the 'solar' brand has the largest sale. **[Bank PO]**

- Conclusions :**
- I. The volume of sales of all the brands of television sets manufactured in India, is known.
 - II. The production of no other television set in India is as large as that of 'solar'.

- 6. Statement :** Parents are prepared to pay any price for an elite education to their children.

- Conclusions :**
- I. All parents these days are very well-off.
 - II. Parents have an obsessive passion for a perfect development of their children through good schooling.

- 7. Statements :** 1. The TV programmes, telecast specially for women are packed with a variety of recipes and household hints.

2. A major portion of magazines for women also contains the items mentioned above.

- Conclusions :**
- I. Women are not interested in other things.

- II. An average woman's primary interest lies in home and specially in the kitchen.

- 8. Statement :** Patients with minor ailments usually do not go to eminent doctors.

- Conclusions :**
- I. Eminent doctors remain too busy with patients suffering from serious complications.
 - II. Their charges are rather high.

- 9. Statement :** From all available cultural records, it is evident that even in ancient India, both the masters and disciples valued not the quantity but the quality of knowledge.

- Conclusions :**
- I. Giving importance to quantity of knowledge is meaningless.
 - II. There was an identity of educational values between teachers and students in ancient India.

- 10. Statement :** The doctors nursed only those bleeding wounds, which were caused by bullets. A patient X was bleeding profusely.

- Conclusions :**
- I. X was nursed by the doctors.
 - II. The doctors did not nurse X.

- 11. Statement :** In a one day cricket match, the total runs scored by a team were 200. Out of these 160 runs were made by spinners.

- Conclusions :**
- I. 80% of the team consists of spinners.
 - II. The opening batsman was spinner.

- 12. Statement :** Players who break various records in a fair way get special prizes. Player X broke the world record but was found to be under the influence of a prohibited drug.

Conclusions : I. X will get the special prize.

II. X will not get the special prize.

13. Statement : National Aluminium Company has moved India from a position of shortage to self sufficiency in the metal.

Conclusions : I. Previously, India had to import aluminium.

II. With this speed, it can soon become a foreign exchange earner.

14. Statement : The domestic demand has been increasing faster than the production of indegeneous crude oil.

Conclusions : I. Crude oil must be imported.

II. The domestic demand should be reduced.

15. Statement : He stressed the need to step the present examination system and its replacement by other methods which would measure the real merit of the students.

Conclusions : I. Examinations should be abolished.

II. The present examination system does not measure the real merit of the students.

Directions: In each of the following questions, a statement has been given followed by two conclusions. Give answer (a) if conclusion I is true and II is wrong; (b) if both the conclusions are true; (c) if both the conclusions are wrong and (d) if conclusion II is true and I is wrong.

16. Statement : The percentage of the national income shared by the top 10 per cent of households in India is 35.

Conclusions : I. When an economy grows fast, concentration of wealth in certain packets of population takes place.

II. The national income is unevenly distributed in India.

17. Statement : The use of non-conventional sources of energy will eliminate the energy crisis in the world.

Conclusions : I. Modern technology is gradually replacing the conventional sources of energy.

II. The excessive exploitation of environment has led to depletion of conventional sources of energy.

18. Statement : In India, the fruits of development have not been equitably distributed between our rural and urban sectors.

Conclusions : I. Rural poverty is substantially higher than urban poverty.

II. A large family size in India may be a consequence rather than a cause of poverty.

Directions: In each of the following questions, a statement is given followed by two conclusions I and II. Mark answer (a) if both the conclusions can be drawn from the statement; (b) if only I can be drawn, (c) if only II can be drawn, (d) if neither I nor II can be drawn and (e) if either I or II can be drawn.

19. Statement : The TV staff deserves an applaud for showing booth capturing.

Conclusions : I. TV always aims at showing things in their true perspective.

II. People involved in booth-capturing have been recognized and are being tried by law.

20. Statement : Smoking is one of those human weakness which tends to test the will power of the smoker to the edge.

Conclusions : I. It is very difficult for the smokers to give up smoking even if they want to do so.

II. Human beings have other weaknesses as well.

- 21.** Statement : Video libraries are flourishing very much these days.
 Conclusions : I. People in general have got a video craze.
 II. It is much cheaper to see as many movies as one likes on videos rather than going to the cinema hall.
- 22.** Statement : All those political prisoners were released on bail who had gone to jail for reasons other than political dharnas. Bail was not granted to persons involved in murders.
 Conclusions : I. No political prisoner had committed murder.
 II. Some politicians were not arrested.
- 23.** Statement : No country is absolutely self-dependent these days.
 Conclusions : I. It is impossible to grow and produce all that a country needs.
 II. Countrymen in general have become lazy.

Directions: In each question below is given a statement followed by two conclusions I and II. Give answer (a) if conclusion I is implicit; (b) if conclusion II is implicit; (c) if both I and II are implicit; (d) if either I or II is implicit and (e) if neither I nor II is implicit.

- 24.** Statement : The best way to escape from a problem is to solve it.
 Conclusions : I. Your life will be dull, if you don't face a problem.
 II. To escape from problems, you should always have some solutions with you.
- 25.** Statement : Good is the enemy of the best.
 Conclusions : I. You should be good to your best enemy.
 II. The best do not like the good.

ANSWERS

- | | | | | | | | | | |
|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| 1. (d) | 2. (d) | 3. (e) | 4. (c) | 5. (c) | 6. (b) | 7. (b) | 8. (c) | 9. (b) | 10. (d) |
| 11. (e) | 12. (b) | 13. (c) | 14. (d) | 15. (b) | 16. (d) | 17. (b) | 18. (a) | 19. (b) | 20. (a) |
| 21. (a) | 22. (b) | 23. (b) | 24. (e) | 25. (a) | | | | | |

Deriving Conclusions from Passages

This section comprises some questions on logical deduction. Here, each question consists of a passage followed by five inferences based on it. Readers are required to analyse the passage and grasp desirable facts from it. Then, he has to consider each inference in context of the given passage, decides its degree of truth or falsity and then choose the best alternative provided in the question.

Directions: Read the following passage and examine each inference given below it in the context of this passage. Mark answer (a) if the inference is definitely true; (b) if the inference is probably true; (c) if the data is inadequate; (d) if the inference is probably false; and (e) if the inference is definitely false.

EXAMPLE 1 The bauxite deposits in India are widely distributed. Recently, deposits in Orissa have been developed and the largest plant of its kind in Asia has been set up to produce alumina and aluminium. Its annual capacity is 800,000 tonnes of alumina and 2,25,000 tonnes of aluminium. It uses the latest French technology. The ore is exported to Japan and European countries. In 1987, the output of bauxite was 2.8 million tonnes. The country's reserves are estimated at 270 million tonnes, of which 73 million tonnes are of high quality.

- (i) The plant set up in Orissa is the largest in India.
- (ii) Aluminium is exported to Japan and European countries.
- (iii) Orissa is the largest producer of bauxite in India.
- (iv) The plant in Orissa was set up by financial aid from France.
- (v) About 27% of total reserves of bauxite are of high quality.

Solution

- (i) (a) Since, the plant set up in Orissa is the largest in Asia, it is evident that it is also the largest in India.
- (ii) (e) Not aluminium, but its ore is exported to Japan and European countries.
- (iii) (b) Since the largest bauxite producing plant is in Orissa, it is much possible that Orissa is the largest producer of bauxite.

- (iv) (e) The plant set up in Orissa uses French technology; it was not set up by financial aid from France.
- (v) (a) Total reserves of bauxite = 270 million tonnes. High quality reserves = 73 million tonnes. Percentage of high quality bauxite reserves = $\left(\frac{73}{270} \times 100\right)\% = 27\%\text{.}$

EXAMPLE 2 According to trade estimates, the black pepper crop will be in the range of 75,000 to 95,000 tonnes during the pepper season from November 1989 to October 1990. The crop will be thus the double of that for the 1988–89 season. Besides good monsoon, the record production is attributed to the crash programme launched in Kerala by the State Government last June. Although 80% of the country's total black pepper production is grown in Kerala, the yield per hectare is low at 300 kg as compared to 550 kg in Indonesia and 1200 kg in Brazil.

- (i) India exports black pepper more than that of Brazil.
- (ii) In no other state in the country black pepper yield is more than 300 kg/hectare.
- (iii) Good water supply is needed for cultivating black pepper.
- (iv) The black pepper crop during 1988–89 was about 30,000 tonnes.
- (v) The Central Government helped the Kerala Government in implementing the crash programme.

[RBI Exam]

Solution

- (i) (c) Nothing is mentioned about the exports of India and Brazil in the passage.
- (ii) (b) As mentioned in the passage, Kerala is the largest pepper producing state and the yield per hectare is 300 kg. But other states show a low yield and so a less production of black pepper.
- (iii) (a) The good monsoon has led to a high production of black pepper as mentioned in the passage.
- (iv) (e) The total produce during 1989–90 was estimated to be 75,000 to 95,000 tonnes and the produce during 1988–89 was half of this, which is more than 30,000 tonnes.
- (v) (c) It is mentioned in the passage that crash programme was launched by Kerala Government. But there is no mention of the efforts or aid of the Central Government to the programme.

EXERCISES

Directions: In each question below is given a passage followed by several inferences. You have to examine each inference separately in the context of the passage and decide upon its degree of truth or falsity.

Mark answer (a) if the inference is 'definitely true'; (b) if the inference is 'probably true' though not definitely true in the light of facts given; (c) if the data are inadequate; (i.e. from facts given you cannot say whether the inference is likely to be true or false); (d) if the inference is 'probably false' though not definitely false in the light of the facts given; and (e) if the inference is 'definitely false'.

1. In the forties, nationalisation was considered the panacea for all socio-economic ills. Today, privatisation has become the buzzword that has been sweeping both the developed and the developing world for more than a decade now. Even in India, the idea has been gathering momentum. But before the idea is transplanted in India, there are several aspects of privatisation that need to be understood. It would be worthwhile, in this context, to look at the experiences of other countries.

- (i) Other countries which have adopted privatisation are considering now to change over to industrialisation.
- (ii) Privatisation has been practiced in the USA since long.
- (iii) India is also thinking of privatisation.
- (iv) Nationalisation has failed to improve substantially the socio-economic situation of some countries.
- (v) India is the first country in Asian subcontinent to adopt privatisation.

[Bank PO]

2. The Ministry of Environment and Forest has granted environmental clearance to the Karkatla open-cast expansion project of the Central Coal fields Ltd. in Bihar that envisages exploitation of non-cooking coal reserves. The present production level of 0.8 million tonnes is proposed to be expanded to 1.5 million tonnes per annum at an estimated cost of 67.82 crores under the project. The total land area requirement for the proposed mining activities is about 651 hectares which includes about one sixth of it as forest land.
 - (i) The expansion plan would require about 100 hectares of forest land.
 - (ii) Karkatla open-cast mine is the only one of non-cooking coal in the country.
 - (iii) There is no demand for non-cooking coal.
 - (iv) The production cost of one tonne of non-cooking coal from Karkatla mine will be about ₹ 450.
 - (v) Environmental concerns get less priority over the need of the coal.

[Bank PO]

3. There is more bad news on food front. It now appears certain that there will be a shortfall of about 9 million tonnes in the food production achieved in the last *kharif* season. However, rice procurement may only be partially affected since West Bengal and Andhra Pradesh have had sufficient rainfall while Punjab, the major contributor to the central pool is less dependent on rainfall. Still, the overall availability of rice may go down by more than four million tonnes. There may be worst news ahead.
 - (i) There is no canal water facility in West Bengal and Andhra Pradesh.
 - (ii) The procurement price of rice will increase this year.
 - (iii) Rice is mainly produced in the *kharif* season.
 - (iv) In the last year, there was a deficit production of rice by five million tonnes.
 - (v) It is likely that production of rice will be below the normal level in the next year.

[Bank PO]

ANSWERS

- | | |
|--|--|
| 1. (i) (e) (ii) (c) (iii) (a) (iv) (a) (v) (e) | 2. (i) (a) (ii) (c) (iii) (a) (iv) (a) (v) (c) |
| 3. (i) (a) (ii) (b) (iii) (a) (iv) (e) (v) (b) | |

Explanations

1. (i) As mentioned in the passage, the idea of privatisation has been sweeping both the developed and the developing world for more than a decade.
- (ii) In the passage, nothing has been mentioned about the USA.
- (iii) It has been clearly mentioned in the passage that the idea of privatisation has been gathering momentum in India.

- (iv) It is mentioned in the passage that earlier nationalisation was considered the remedy for socio-economic ills whereas at present, the idea of privatisation is dominant. This implies that nationalisation failed to improve the socio-economic situations of some countries.
- (v) As mentioned in the passage, the idea of privatisation is being promoted all over the world and has not been successfully transplanted in India.
2. (i) According to the passage, land required for expansion plan = 651 hectares.

$$\text{Forest land} = \left(\frac{1}{6} \text{ of total land} \right) = \frac{1}{6} \times 651$$

$$= 108.5 = 100 \text{ (approximately)}$$

- (ii) It is mentioned only that Karkatla mine deals with exploitation of non-cooking coal reserves. But, it is not given that it is the only such mine.
- (iii) The granting of environmental clearance to Karkatla mine shows that there is a demand for non-cooking coal.
- (iv) Total estimated production = 1.5 million tonnes = (1.5×10^6) tonnes.

$$\text{Total estimated cost} = ₹ 67.82 \text{ crores} = ₹ (67.82 \times 10^7)$$

$$\text{Cost per tonne of coal} = ₹ \left[\frac{67.82 \times 10^7}{1.5 \times 10^6} \right]$$

$$= ₹ 452.13 = ₹ 450 \text{ (approximately)}$$

- (v) The given fact is neither mentioned nor can be derived from the passage.
3. (i) As mentioned in the passage, the rice production in West Bengal and Andhra Pradesh would not be affected since they had sufficient rainfall. This implies that the farming there is dependent mainly on rain and no other irrigation facilities are available.
- (ii) As mentioned in the passage, the rice production has gone down which may lead to a rise in procurement price of rice.
- (iii) The given fact is clearly evident from the given passage.
- (iv) As mentioned in the passage, there is a deficit production of rice by five million tonnes in the present year.
- (v) It is mentioned in the passage that 'There may be worst news ahead'. There is no surety about the given fact, but it appears to be true according to the present trends.

SECTION C NONVERBAL REASONING

Chapter 22

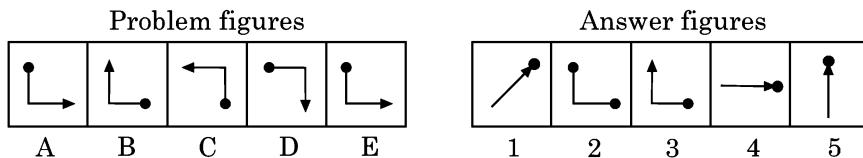
Series

In this chapter, four types of series of figures are given. There will be a set of answer figure also. You have to identify the most appropriate figure from the set of answer figures.

TYPE 1: FIVE FIGURE SERIES

This type of problems on series consists of five figures numbered A, B, C, D and E forming *the problem set*, followed by five other figures numbered 1, 2, 3, 4 and 5 forming *the answer set*. The five consecutive problem figures form a definite sequence and it is required to choose one of the figures from the answer set which will continue the same sequence.

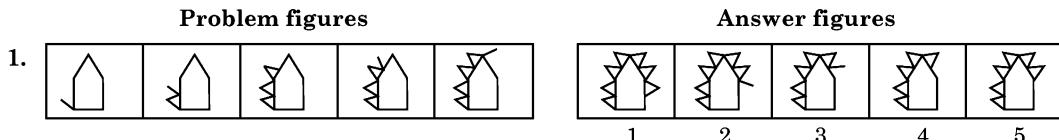
EXAMPLE 1



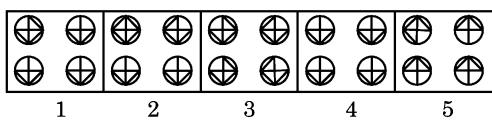
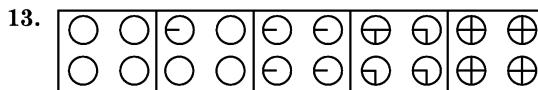
Solution In this case, the pin rotates 90° clockwise and the arrow rotates 90° anticlockwise in each step. Hence, the answer is figure (3).

EXERCISE 1

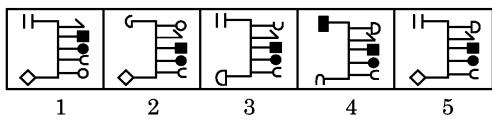
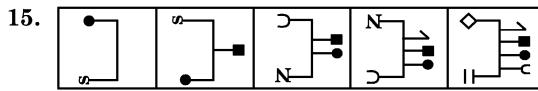
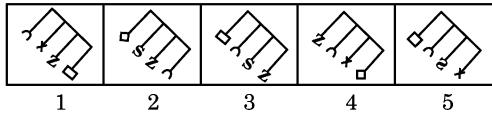
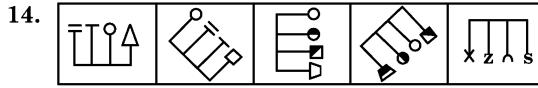
Directions (Q. 1-15): In each of the questions given below which one of the five answer figures on the right should come after the problem figures on the left, if the sequence were continued?



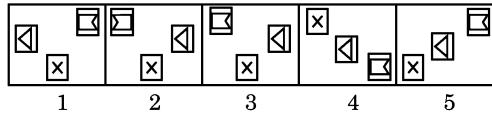
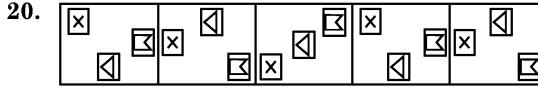
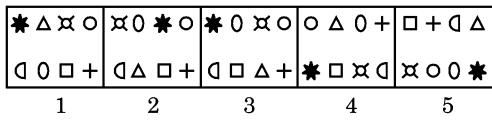
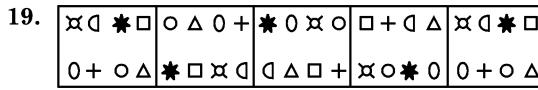
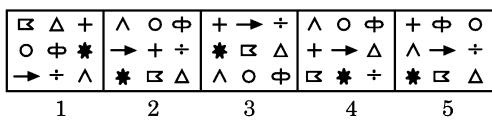
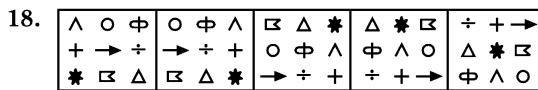
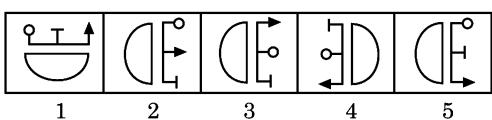
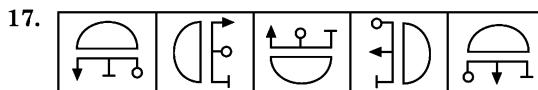
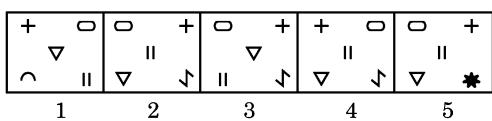
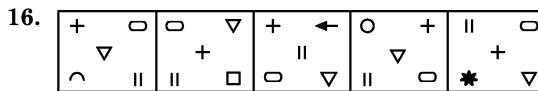
2. 1 2 3 4 5
3. 1 2 3 4 5
4. 1 2 3 4 5
5. 1 2 3 4 5
6. 1 2 3 4 5
7. 1 2 3 4 5
8. 1 2 3 4 5
9. 1 2 3 4 5
10. 1 2 3 4 5
11. 1 2 3 4 5
12. 1 2 3 4 5



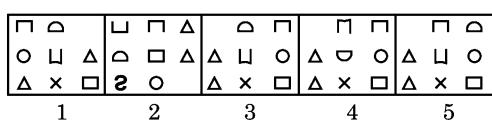
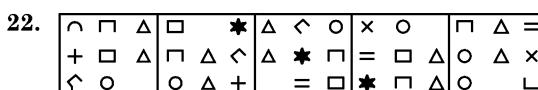
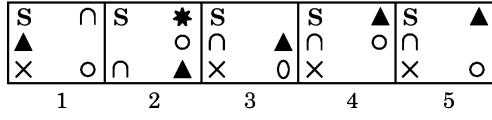
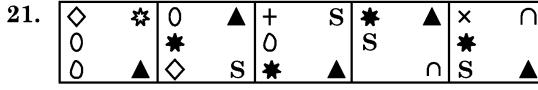
1 2 3 4 5

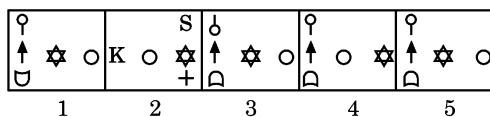
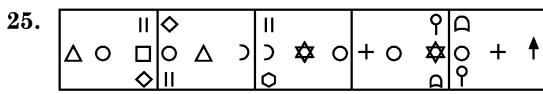
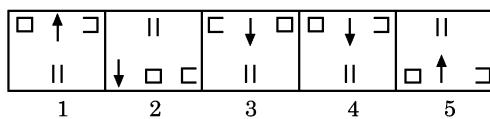
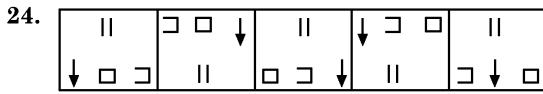
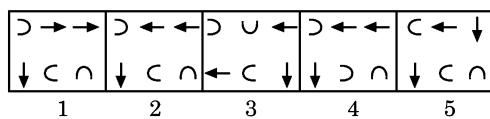
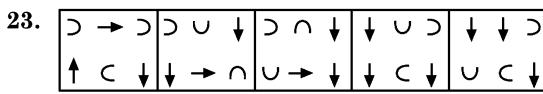


Directions (Q. 16–20): Each of the following questions consists of unmarked figures followed by figures marked 1, 2, 3, 4 and 5. Select a figure from the marked figures which will continue the series established by the unmarked figures.

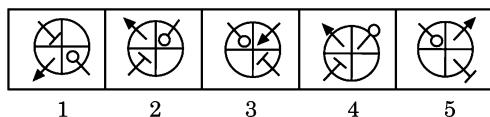
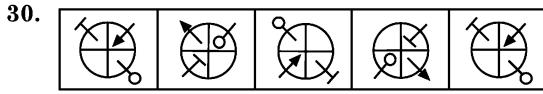
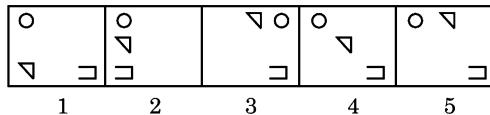
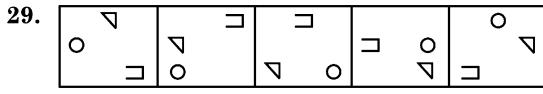
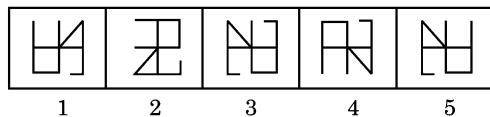
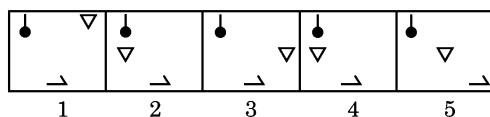
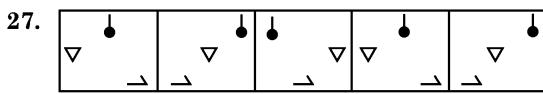
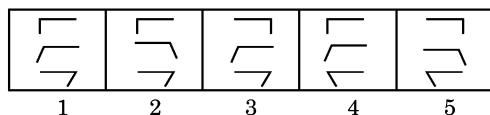


Directions (Q. 21–25): Each of the following questions consists of unmarked figures followed by five figures marked 1, 2, 3, 4 and 5. Select a figure from the marked figures which will continue the series established by the unmarked figures.





Directions (Q. 26–30): Each of the following questions consists of unmarked figures followed by five figures marked 1, 2, 3, 4 and 5. Select a figure from the marked figures which will continue the series established by the unmarked figures.



ANSWERS

- | | | | | | | | | | |
|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| 1. (5) | 2. (3) | 3. (2) | 4. (1) | 5. (4) | 6. (2) | 7. (4) | 8. (3) | 9. (4) | 10. (5) |
| 11. (3) | 12. (5) | 13. (1) | 14. (3) | 15. (1) | 16. (2) | 17. (5) | 18. (3) | 19. (4) | 20. (5) |
| 21. (5) | 22. (4) | 23. (5) | 24. (3) | 25. (1) | 26. (1) | 27. (3) | 28. (4) | 29. (5) | 30. (2) |

Explanations

- In subsequent steps one, two three one line segments are added.
- In subsequent steps, the ACW-end element shifts one-and-a-half side ACW. The CW-end element shifts one side CW while a new element appears in the middle.

3. In each step the elements get inverted while the arrows and the end-elements inter-change places in alternate steps.
4. Two end one arcs get inverted in alternate steps.
5. One, two, three, elements get inverted in subsequent steps in succession.
6. In subsequent steps 5, 4, 3, 5, ... elements from CW and shift half-a-side CW while others shift half-a-side ACW.
7. In alternate steps the elements of LHS and RHS columns shift one step downward while one of the elements in the other column gets replaced by a new one.
8. In each step whole figure rotates by 45° ACW. The triangular element gets inverted and its shading is changed while the semi-circular elements change their side and shading in alternate steps.
9. In alternate steps the elements shift one-and-a-half sides and half a side ACW while one element is replaced by a new one in each step. The replacement happens in succession.
10. In each step one element is replaced by a new one, alternately on upper and lower parts, while the other interchanges place in one step and gets inverted in the next step.
11. In subsequent steps the upper part of LHS element becomes lower without getting inverted while the lower part of RHS becomes the upper after getting inverted.
12. The whole figure rotates by 90° ACW. All the three dashes on lower figure change direction while the two dashes on upper figure change direction in each step.
13. In subsequent steps 1, 3, 5, 7, 9 lines are added beginning from the upper-left.
14. The whole figure rotates by 45° CW in each step. In alternate steps three elements shift one step in cyclic order while one end element is replaced by a new one.
15. In alternate steps the LHS elements interchange position while a new element is added alternately at upper and lower ends of RHS.
16. The central element and two other elements move one step ACW in cyclic order. The other two interchange positions and one of them is replaced by a new one. The cyclic movement rotates one step in ACW order.
17. The whole figure rotates by 90° ACW. The middle tip becomes lowest tip, lowest becomes upper and upper becomes middle in alternate steps.
18. In the first step elements move one step from right to left, the left most becoming the rightmost. In the next step the row of elements moves one step downwards. This goes on alternately.
19. In the first step the pairs of elements interchange diagonally. In the next step the elements on the outer side move one side CW while those on the inner side move one side ACW. This goes on alternately.
20. In each step elements move half a side downwards. The lower most moves to upper most.
21. In the first step the upper-and-lower left elements interchange places. The lower-right moves to upper-right, the upper-right moves to middle left while a new element appears at lower right. In the next step the upper and lower-right elements interchange place. The elements in the left column move one step downwards while a new element appears at upper-left position.
22. Two elements of the middle column interchange places sequentially while the upper two and lower two elements of the first column interchange places and the third is replaced by a new one. The columns of elements move one step towards left while the left most element moves to the rightmost position. The column with only two elements moves up and down in subsequent steps.
23. In the first step the rightmost element of each row moves to the left most while other two rotate by 90° CW and move one step towards right. In the next step the end elements of the

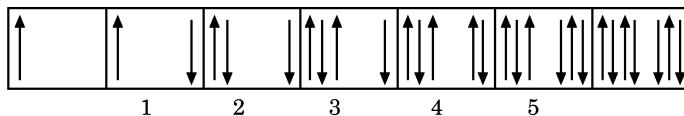
lower row and the middle element of the upper row move one step ACW in cyclic order while others remain unchanged.

24. In every step middle two elements get inverted and two end elements moved CW by two sides in first step and half-a-side and two-and-a-half side each respectively CW in the next step. Then the process repeats.
25. In the first step the odd-numbered elements from top rotate by 90° CW. In the next step the even-numbered elements from top rotate by 90° ACW.
26. The middle and side elements rotate by 180° alternately.
27. The elements move half-a-side in rows from left to right in each step. After reaching the rightmost position they shift to the left most position.
28. The rectangle moves one step ACW while the dash moves one step CW in each step.
29. Elements move one side and half-a-side ACW alternately in each step.
30. The elements move one step ACW and change their direction in each step.

TYPE 2: FIND OUT THE WRONG FIGURE IN THE SERIES

This type of questions begins with an un-numbered figure followed by five figures numbered from 1 to 5 and then again an un-numbered figure on the extreme right. These seven figures together form a series which starts at the first (un-numbered) figure and ends at the last (un-numbered) figure. However, only one of these figures does not fit into the series. The number of that figure is the answer.

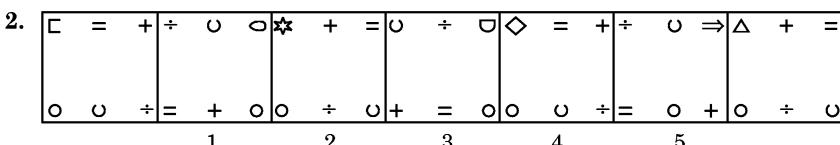
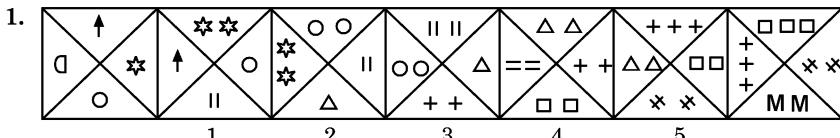
EXAMPLE 2

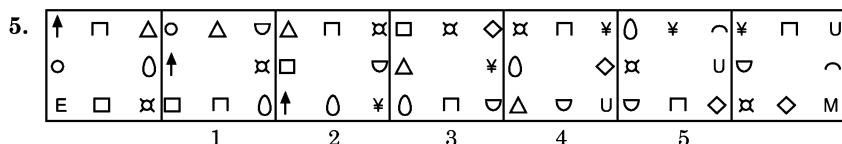
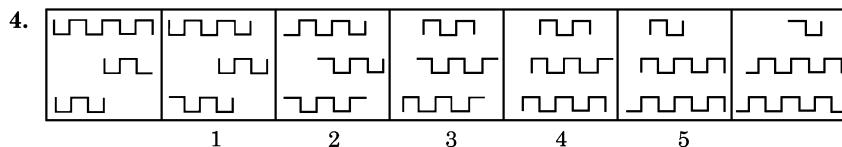
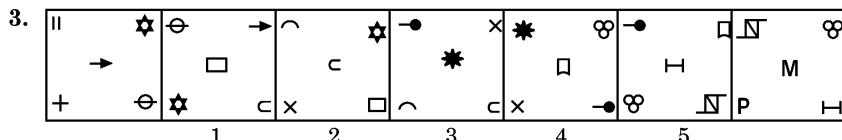


Solution In the above set of figures, the arrows are added to the right and left sides alternately. But in the third figure the arrow which was to be added to the right side, has been added to the left side. Hence figure (3) is the answer.

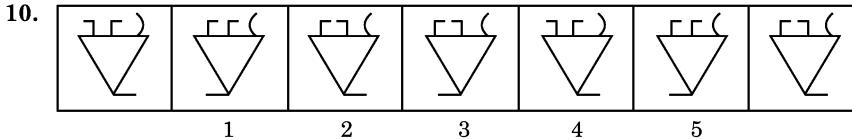
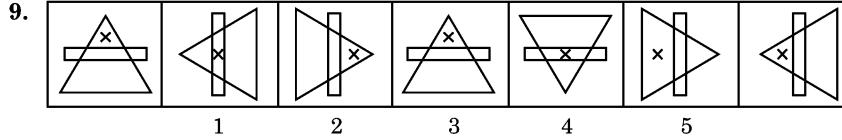
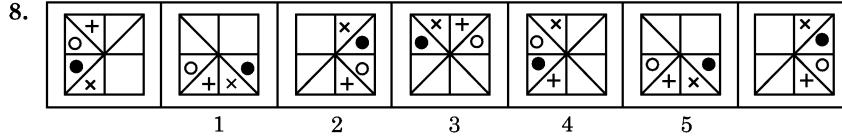
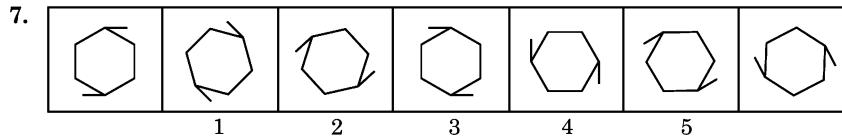
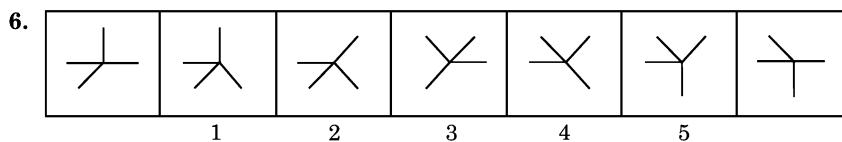
EXERCISE 2

Directions (Q. 1-5): In each of the following problems, a related pair of figures is given followed by five numbered pairs of figures. Four out of five pairs have similar relationship as that of the original pair. Select a pair that does not have a relationship similar to that in the original pair.

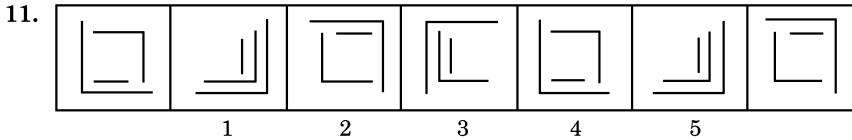


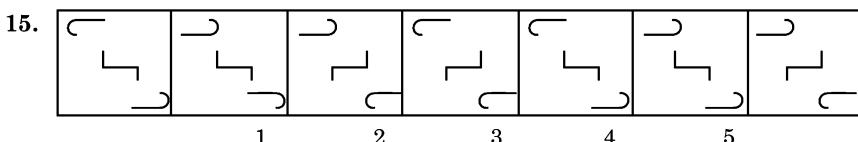
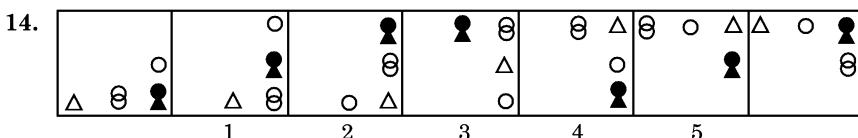
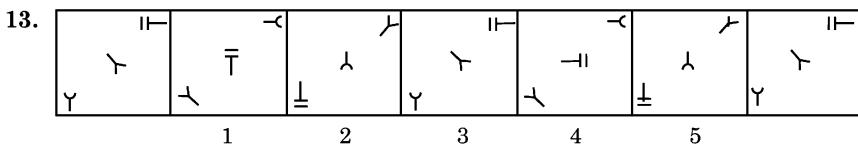
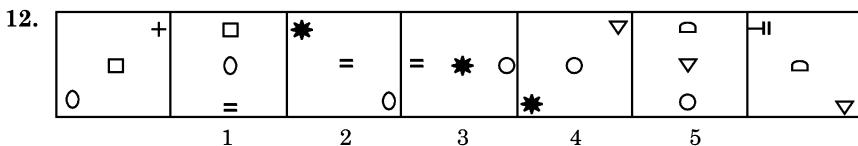


Directions (Q. 6–10): Each of the following series consists of seven figures, two of which at the ends are unnumbered. One of the five numbered figures does not fit into the series. Find out the figure.



Directions (Q. 11–15): Each of the following series consists of seven figures, two of which at the ends are unnumbered. One of the five numbered figures does not fit into the series. Find out the figure.





ANSWERS

1. (4) 2. (5) 3. (2) 4. (3) 5. (1) 6. (3) 7. (2) 8. (4) 9. (2) 10. (3)
 11. (3) 12. (2) 13. (4) 14. (5) 15. (1)

Explanations

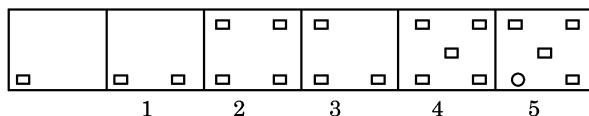
- The elements move one step ACW. The element reaching the upper part increases by one while that reaching lower part is replaced by a new one.
- In alternate steps the upper-right and the upper-left pair move downwards diagonally. While a new element appears alternately on upper-right and upper-left. The circle in the lower row moves from one end to the other in each step. The other two elements in the lower row interchange places and move upwards diagonally.
- In each step three elements move diagonally while other two interchange places diagonally. Two elements—one at centre and one at a corner—are replaced by new ones. This movement rotates by 90° CW.
- In each step one and two line segments alternately from left and right side of the upper element are lost while two line segments—one each in the middle and the lower element are added alternately on right and left side.
- In the first step elements at positions 1 and 4 interchange places. So do elements at positions 6 and 9. 3 moves to 2 → 8 → 7 while a new element appears at position 3. In the next step 3 and 6 and 4 and 7 interchange their places. 9 moves to 8 → 2 → 1 while a new element appears at 9.
- In each step one arm gets rotated by 45° CW. This movement proceeds in ACW direction.
- The whole figure rotates by 45° CW and 90° ACW alternately while end elements get inverted in each step.

8. The whole figure rotates through 90° ACW in each step and symbols inside a square gets interchanged within it in every step.
9. The whole figure rotates by 90° and 180° ACW alternately. 'x' moves from vertex to base.
10. The lower dash changes direction in each step while the upper elements change direction alternately.
11. The outermost and innermost sides rotate by 90° ACW while the middle one rotates by 90° CW.
12. The elements shift one step in cyclic order and one element is replaced by a new one. The line of orientation rotates by 45° ACW.
13. The uppermost element rotates 90° CW and moves to the middle. The middle element rotates by 180° and moves to lower position while the lower element rotates by 90° CW and moves to the upper position.
14. The elements move one step ACW in one step while in the next the element on extreme ACW position moves to CW and others move one step ACW.
15. The upper and the lower element rotate by 180° while the middle one gets inverted vertically in alternate steps.

TYPE 3: DETECTING THE INCORRECT ORDER IN A SERIES

The third type of questions on series consists of an un-numbered figure followed by five other figures numbered as 1, 2, 3, 4 and 5. All the six figures together form a series. The un-numbered figure marks the beginning of the series and so its position is fixed. However, the positions of two figures in the series are incorrect and the series would be complete if these figures are interchanged. The earlier of the two numbered figures whose positions are interchanged is the answer. In case, the position of no two figures is to be interchanged, then the answer is 5.

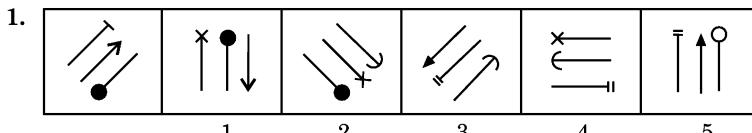
EXAMPLE 3

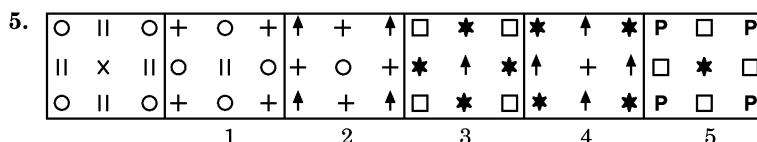
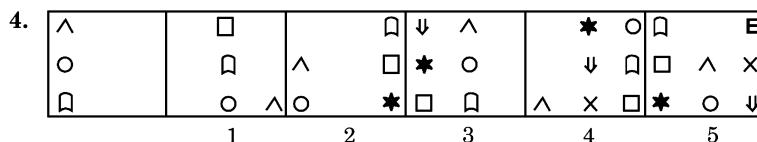
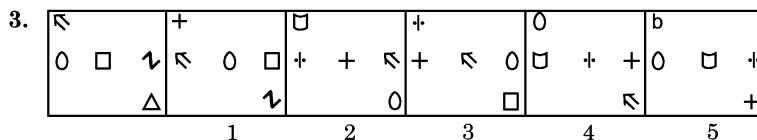
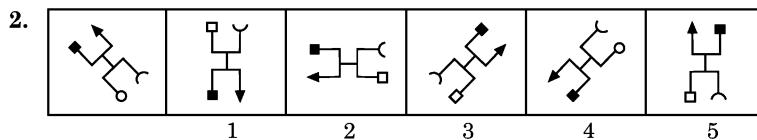


Solution Here, the number of squares increases in step by one and then these squares change into circles stepwise. But this series will be established only if figure (2) and figure (3) are interchanged. So, the answer is (2).

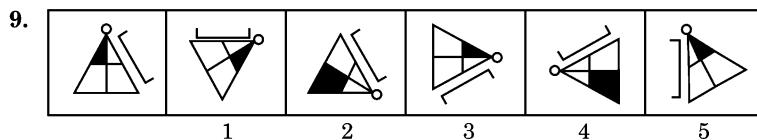
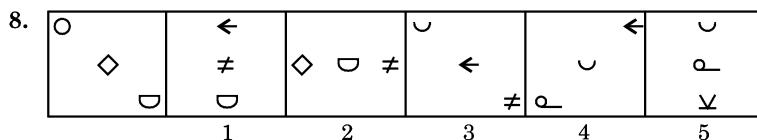
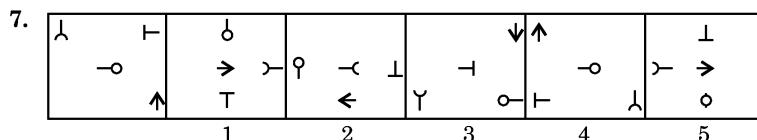
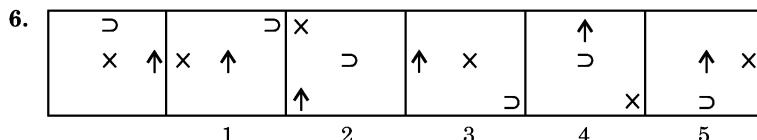
EXERCISE 3

Directions (Q. 1-5): Each of the following questions consists of six figures, the first of which is unnumbered and marks the beginning of the series continued in the successive figures numbered from 1 to 5. However, the series will be established only if the positions of two of the numbered figures are interchanged. The number of the first of the two figures is the answer. If no figure need to be interchanged then the answer is 5.

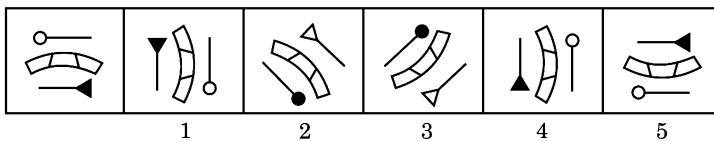




Directions (Q. 6-10): Each of the following questions consists of six figures, the first of which is unnumbered and marks the beginning of the series continued in the successive figures numbered from 1 to 5. However, the series will be established only if the positions of two of the numbered figures are interchanged. The number of the first of the two figures is the answer. If no figure need to be interchanged then the answer is 5.



10.

**ANSWERS**

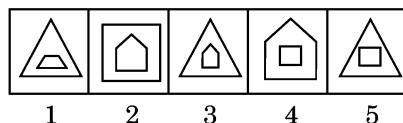
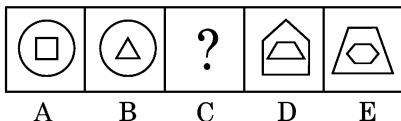
1. (3) 2. (1) 3. (2) 4. (5) 5. (3) 6. (3) 7. (5) 8. (4) 9. (5) 10. (1)

Explanations

- The central element interchanges place alternately with the element on either side and gets inverted while the third one is replaced by a new one. The whole figure rotates by 45° ACW in each step.
- The whole figure rotates by 45°, 90°, 135°, 180° ACW in subsequent steps while the end elements interchange their places alternately on either end in subsequent steps.
- In each step the elements move one step downwards and towards right. A new element appears at the top-left position while the lower one is lost.
- The column of elements moves half-a-side from left to right. The central element interchanges alternately with upper and lower elements and the third element is placed at the lower end of the next column.
- In each step the similar corner elements move to the middle of the sides while one of the middle elements moves to the centre. New elements appear at the corners.
- The horizontal arrow rotates by 90° ACW and is placed on LHS. The vertical arrow on the RHS rotates by 90° ACW and its head gets inverted while the LHS arrow rotates by 180° and its head gets inverted.
- The outermost and innermost elements interchange places and sizes. The second element from outside rotates by 180° while the second from inside rotates by 90° CW.
- The upper-right and lower-left elements get vertically inverted and move to middle-right and centre respectively. The central element gets laterally inverted and moves to the lower right.
- The LHS and RHS elements get enlarged. The RHS element becomes the outer one while the LHS becomes the inner one. The number of sides of LHS element increases by one. The middle element gets reduced in size rotates by 135° CW and becomes the innermost.
- The elements move two sides. The end elements get reversed while the middle one remains unchanged.

TYPE 4: CHOOSING THE MISSING FIGURE IN A SERIES

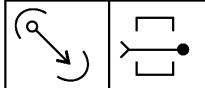
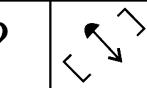
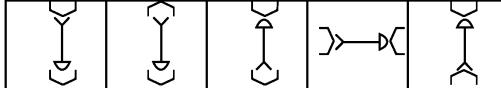
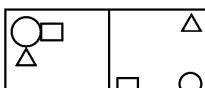
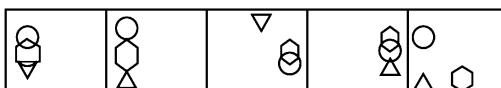
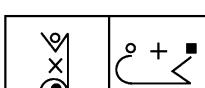
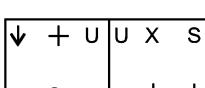
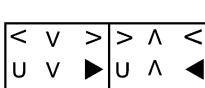
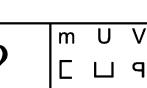
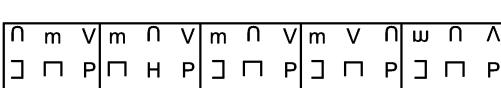
In this type of questions, you are given a set of four or five figures (labelled A, B, C, D and E) following a certain sequence and hence forming a series. However, one of figures in the problem set will be missing. You have to choose this figure from the five alternatives given in the Answer set.

EXAMPLE 4

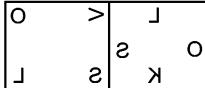
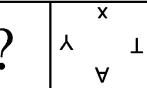
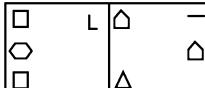
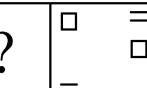
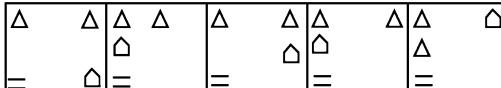
Solution Here, the inner small figure becomes the outer large figure and a new small figure appears inside it in every step. Hence, the answer is (3).

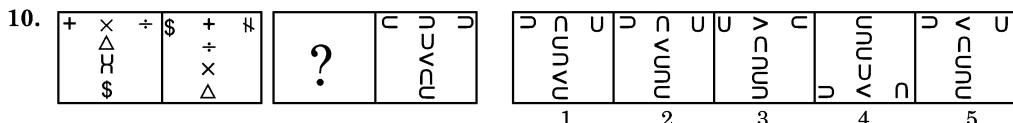
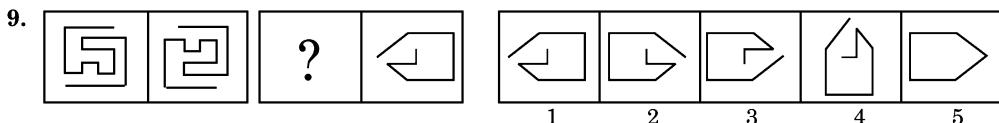
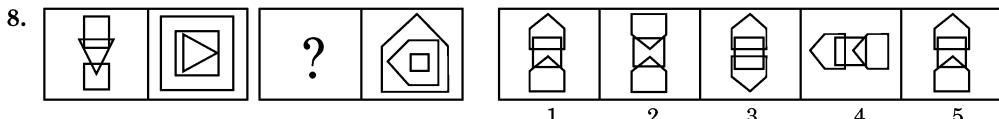
EXERCISE 4

Directions (Q. 1–5): The second figure in the first unit of the problem figures bears a certain relationship to the first figure. Similarly, one of the figures in the answer figures bears the same relationship to the second figure in the second unit of the problem figures. You are therefore to locate the figure which would replace the question mark.

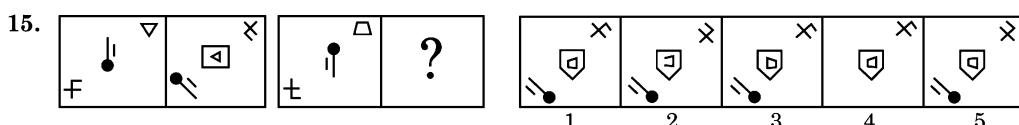
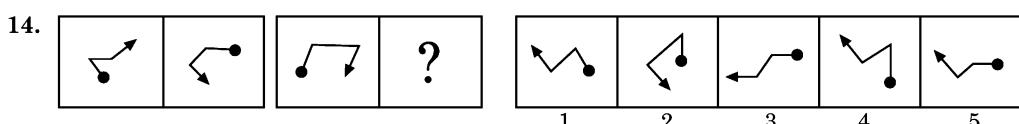
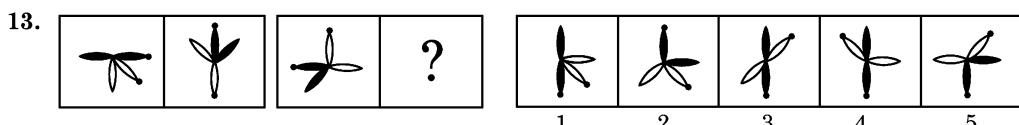
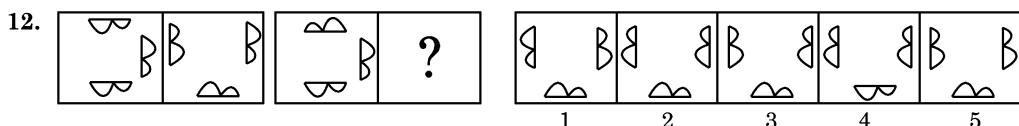
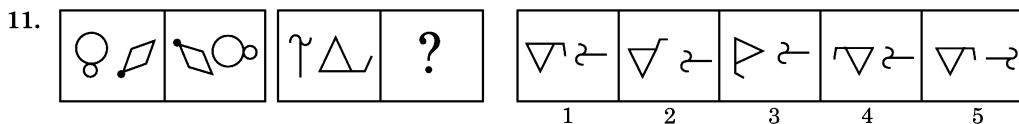
| Problem Figures | Answer Figures |
|--|---|
| 1.  ?  |  1 2 3 4 5 |
| 2.  ?  |  1 2 3 4 5 |
| 3.  ?  |  1 2 3 4 5 |
| 4.  ?  |  1 2 3 4 5 |
| 5.  ?  |  1 2 3 4 5 |

Directions (Q. 6–10): The first figure in the first unit of the problem figures bears a certain relationship to the second figures. Similarly, one of the figures in the answer figures bears the same relationship to the first figure in the second unit of the problem figures. You are therefore to locate the figure which would replace the question mark.

| | |
|--|---|
| 6.  ?  | 1 2 3 4 5 |
| 7.  ?  |  1 2 3 4 5 |



Directions (Q. 11–15): The first figure in the first unit of the problem figures bears a certain relationship to the second figure. Similarly, one of the figures in the answer figures bears the same relationship to the second figure in the second unit of the problem figures. You are therefore to locate the figure which would replace the question mark.



ANSWERS

1. (2) 2. (2) 3. (4) 4. (5) 5. (3) 6. (3) 7. (4) 8. (1) 9. (2) 10. (5)
 11. (3) 12. (1) 13. (3) 14. (4) 15. (3)

Explanations

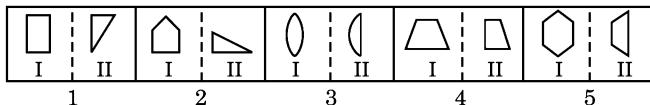
1. From figure II to I: The inner element rotates by 135° ACW, the arrowhead gets inverted, while the other end changes its shading. The outer element rotates by 45° ACW and assumes new form.
2. From figure II to I: The middle element moves to the opposite side and gets enlarged. The CW element moves $1\frac{1}{2}$ sides ACW while the ACW element moves $1\frac{1}{2}$ sides CW.
3. From figure II to I: The main figure rotates by 90° ACW and the curve attached to it gets inverted. The middle element rotates by 45° while the other two elements move one side ACW.
4. From figure II to I: The elements at positions 1, 3 and 8 move one step CW while elements at positions 2, 7 and 9 move one step ACW.
5. From figure II to I: The first and third columns have their mirror image while the middle column has its water image in the LHS figure.
6. From figure II to I: Each element moves one side and a half ACW without getting inverted.
7. From figure II to I: One side increases in each element except in the upper-left, in which one side is lost. The middle row element changes side.
8. From figure II to I: The middle figure rotates by 90° CW and is placed on the upper and the lower part while the innermost is placed in the middle.
9. From figure II to I: The first is laterally inverted form of the second.
10. From figure II to I: The upper three elements in the column go two steps downward. The right element in the row goes down in third row of the column and left element in the lower. The lowermost goes to the second row and the second row to right of the upper row.
11. From figure I to II: The elements interchange positions. The LHS rotates by 90° ACW while the RHS rotates by 90° CW.
12. From figure I to II: The RHS remains constant, the lower element gets vertically inverted while the upper one rotates by 90° ACW and shifts to left.
13. From figure I to II: The shaded petal with the dot rotates by 90° ACW. The unshaded petal with dot rotates by 45° CW while the other two rotate by 135° CW.
14. From figure I to II: The arrow rotates by 90° CW, the pin rotates by 45° ACW while the middle bar rotates by 45° ACW.
15. From figure I to II: The central element rotates by 135° CW gets inverted and shifts to the lower-left. The lower-left rotates by 45° CW gets inverted and shifts to the upper-right while the upper-right rotates by 90° CW and shifts to the centre.

Analogy

This chapter is dealt with identifying the odd pair of figures which are not having a particular relation between them in one way or another.

CHOOSING THE ODD RELATIONSHIP: In this type of questions, five pairs of figures are given. The two figures in four out of five pairs are related in a particular manner. You have to select the pair which does not show the relationship.

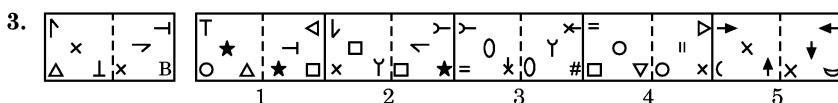
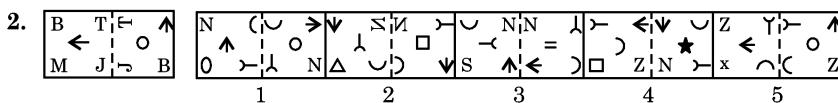
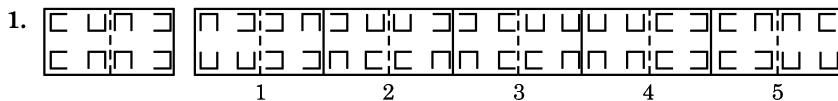
EXAMPLE 1

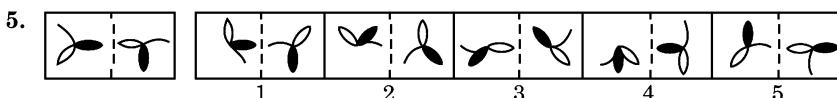
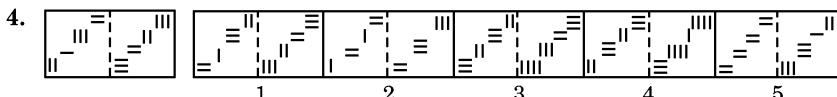


Solution In all the pairs except (2), the second element is half of the first element.

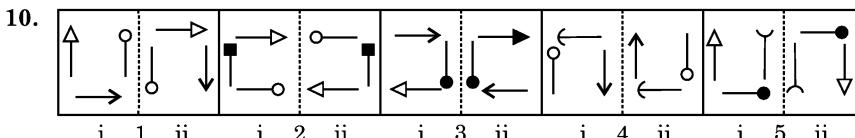
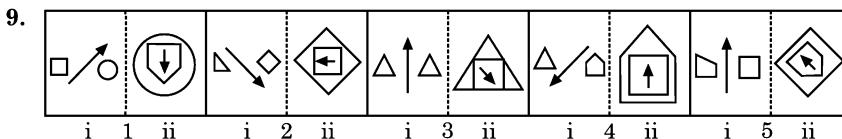
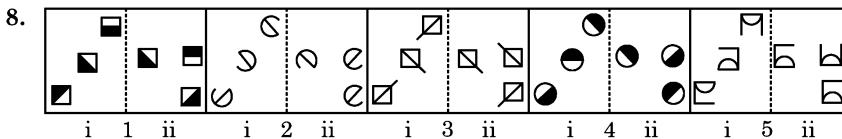
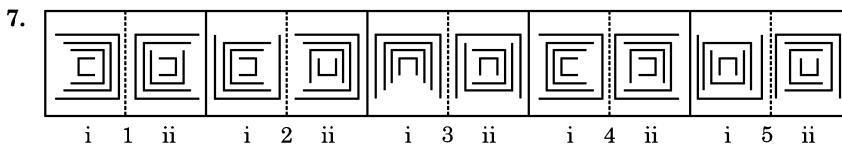
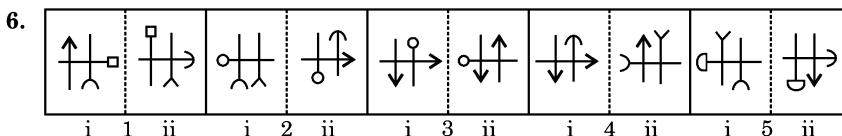
EXERCISE 1

Directions (Q. 1–5): In each of the following problems, a related pair of figures is given followed by five numbered pairs of figures. Four out of five pairs have similar relationship as that of the original pair. Select a pair that does not have a relationship similar to that in the original pair.





Directions (Q. 6–10): In each of the following questions in four out of the five figures, element I is related to element II in the same particular way. Find out the figures in which element I is not related to element II.



ANSWERS

1. (1) 2. (3) 3. (3) 4. (4) 5. (5) 6. (4) 7. (2) 8. (1) 9. (3) 10. (5)

Explanations

- The upper-left and the lower-right elements rotate by 90° CW while the upper-right and the lower-left elements rotate by 90° ACW.
- The upper-left element shifts to lower-right position. The upper-right and lower-right shift to upper-left and lower-left position respectively and rotate by 90° ACW. The central element shifts to the upper-right position and rotates by 90° CW. The lower-left element shifts to centre and changes its shape.

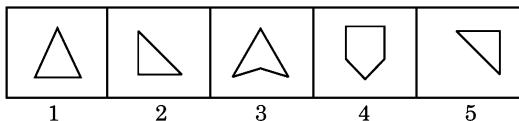
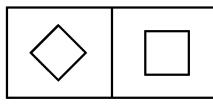
3. The upper-left element rotates by 90° CW and shifts to the centre. The central element moves to the lower-left. The lower-right element rotates by 90° ACW and shifts to the upper-right position while a new element appears at lower-right position.
4. The uppermost and the lowermost sets of dashes rotate by 90° and an additional dash is added to each of them. One dash is lost from second upper set of dashes while one dash is added to the second from the bottom.
5. The unshaded leaf rotates by 45° CW. The shaded leaf rotates by 90° CW. The half-leaf rotates by 135° CW and changes its direction.
6. One of the elements move half-a-side CW one by one while the other two move one step once in row and twice diagonally and again in row in subsequent steps.
7. The CW element shifts to the centre while the central element becomes the ACW element. Other two elements move one-and-a half sides CW. Elements rotate by 90° CW.
8. In each step the elements move from right to left and one of the elements is replaced by a new one. The line on which the elements are arranged rotates by 45° and 90° ACW.
9. The triangle rotates by 45° , 90° , 135° , 180° ... CW in subsequent steps. The shading moves one step CW. The bar outside moves one step CW. The bar outside moves from one side of the outer circle to the other in alternate steps.
10. In the first step the whole figure rotates by 90° CW while the elements on the ends further rotate by 180° . In the next step the whole figure rotates by 45° ACW, elements on the ends interchange positions and their shading also changes. The process goes on.

Classification

In this chapter, problem figures are having same characteristics. You have to identify the most appropriate figure from answer figures, which show some characteristics.

CHOOSING THE FIGURE WITH SAME PROPERTIES: This type of questions contain two figures forming the problem set followed by five other figures forming the answer set. The problem figures have some common characteristics. You are required to select one of the figures from the answer set which also exhibits the same characteristics.

EXAMPLE 1

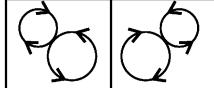
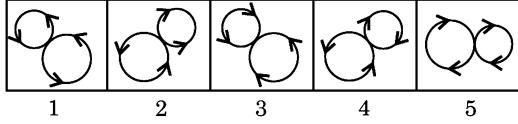
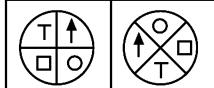
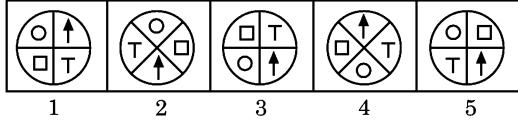
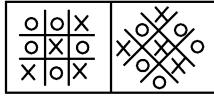
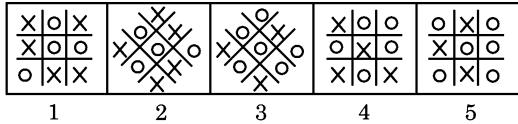
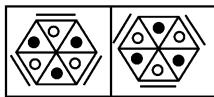
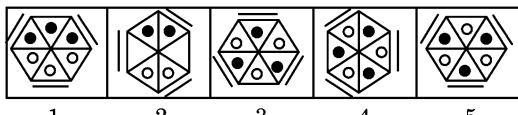


Solution Each one of the two figures on the left has been formed by four distinct lines. Similarly, figure (3) is made up of four lines. Hence figure (3) is the answer.

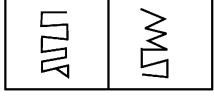
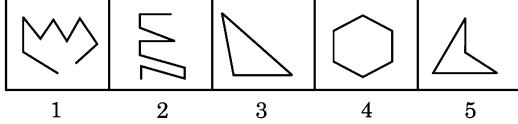
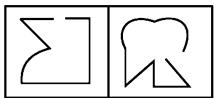
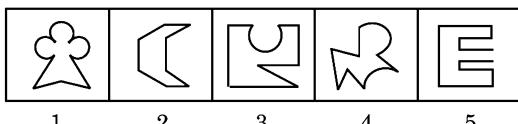
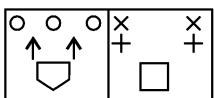
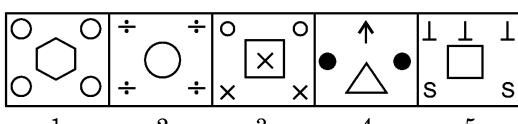
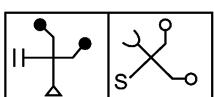
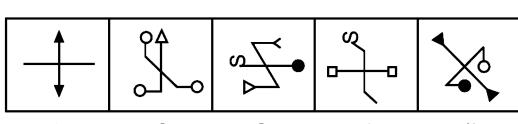
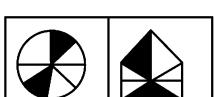
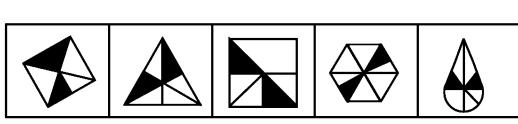
EXERCISE 1

Directions (Q. 1-5): In each question below, two problem figures, followed by five answer figures numbered (1), (2), (3), (4) and (5) are given. The two problem figures have some common characteristics/features. You have to find out one figure out of the five answer figures which has the same features/characteristics. The number of that figure is the answer.

| Problem Figures | Answer Figures |
|-----------------|----------------|
| 1. | |

2.  
3.  
4.  
5.  

Directions (Q. 6–10): The first figure in the first unit of the problem figures bears a certain relationship to the second figure. Similarly, one of the figures in the answer figures bears the same relationship to the second figure in the second unit of the problem figures. You are therefore to locate the figure which would replace the question mark.

6.  
7.  
8.  
9.  
10.  

ANSWERS

1. (5) 2. (4) 3. (3) 4. (4) 5. (4) 6. (1) 7. (5) 8. (4) 9. (2) 10. (5)

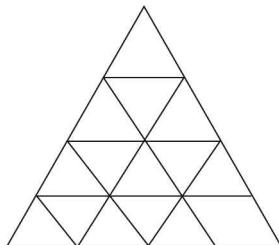
Explanations

1. Two identical elements are placed in the middle and are in the opposite direction.
2. Directions of arrows are CW in one and ACW in the other.
3. Positions of the elements are similar in respect of other elements.
4. Element 'x' is placed in the centre.
5. Shaded and unshaded circles are placed in a definite sequence and outer line segments lie adjacent to unshaded circles.
6. The figures have only one right angle.
7. The figures are open-ended.
8. The number of lines of the enclosed figure is equal to the number of smaller elements.
9. The titled lines have similar shapes on them.
10. The shaded parts have three unshaded parts on one side and two on the other.

Analytical Reasoning

The chapter on analytical reasoning involves the problems relating to the counting of geometrical figures in a given complex figure. You have to analyse the complex figure and determine the number of any particular type of figure as shown in the examples.

EXAMPLE 1 How many straight lines are there in the following figure?



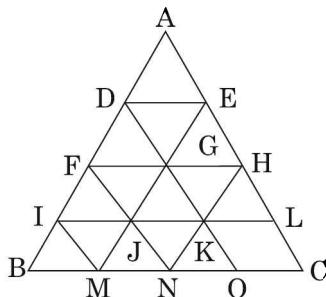
(a) 9

(b) 11

(c) 15

(d) 48

Solution The given figure is as shown below.

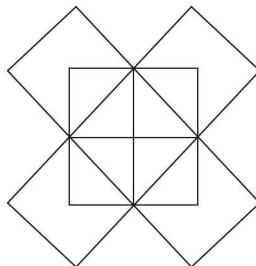


Horizontal lines are DE, FH, IL and BC. i.e., 4 nos.

Slanting lines are IM, FN, DO, AC, AB, EM and HN. i.e. 7 nos.

∴ Total number of lines = 4 + 7 = 11.

EXAMPLE 2 How many rectangles does the following figure have?



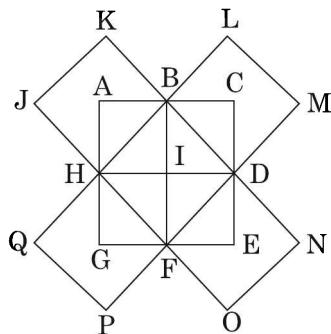
(a) 10

(b) 12

(c) 13

(d) 14

Solution The given figure can be labelled as shown below:

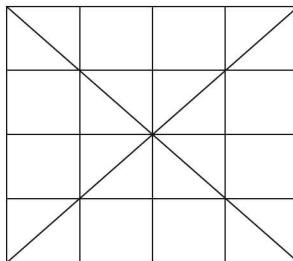


The above figure consists of:

- (i) rectangle JKNO composed of four components JKBH, DNOF, JKDF and BNOH i.e. altogether 5 in numbers;
- (ii) rectangle QLMP composed of four components QHFP, BLMD, QBDP and HLMF i.e. altogether 5 in numbers;
- (iii) square ACEG composed of four components ACDH, BCEF, DEGH and GABF i.e. altogether 4 in numbers.

Hence, total number of rectangles = $5 + 5 + 4 = 14$.

EXAMPLE 3 How many triangles does the following figure have?



(a) 36

(b) 40

(c) 44

(d) 48

Solution The figure may be labelled as shown below.

The simplest triangles are APQ, QTU, UXY, YKC, AEQ, QRU, UVY, YJC, BGS, SRU, UTW, WND, BHS, SVU, UXW and WMD i.e. in all 16 numbers.

The triangles having two components each are QSU, SYU, YWU and WQU i.e. in all 4 numbers.

The triangles having three components each are AFU, FBU, BIU, CLU, LDU, DOU OAU i.e. in all 8 numbers.

The triangles having four components each are QSY, SYW, YWQ, WQS i.e. in all 4 numbers.

The triangles having six components each are ABU, BCU, CDU, DAU i.e. in all 4 numbers.

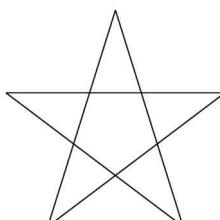
The triangles having seven components each are ANY, GAY, BEW, WJB, HQC, CQM, KSD and DPS i.e. in all 8 numbers.

\therefore Total number of triangles = $16 + 4 + 8 + 4 + 4 + 8 = 44$. Answer is (c)

EXERCISES

1. How many triangles are there in the figure given below?

[IAS]



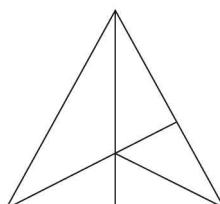
- (b) 6

- (c) 8

- (d) 10

2. How many triangles are there in the following figure?

[IAS]

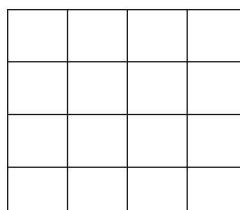


- (b) 10

- (c) 1

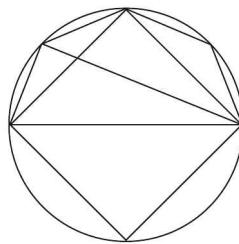
- (d) 12

3. How many squares are there in the following figure?

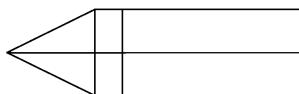


- (a) 16 (b) 17 (c) 25 (d) 27 (e) 30

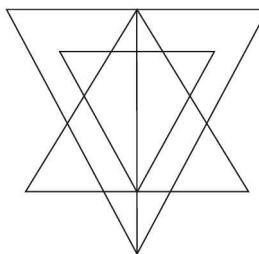
4. Count the number of triangles in the following figure.



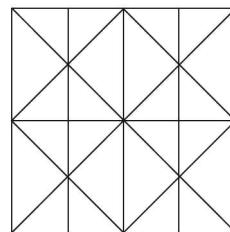
- (a) 8 (b) 10 (c) 11 (d) 12
5. How many rectangles are there in the following figure?



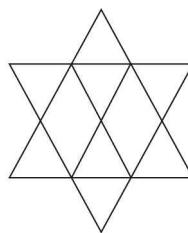
- (a) 6 (b) 7 (c) 8 (d) 9
6. Count the number of triangles in the following figure.



- (a) 27 (b) 25 (c) 23 (d) 21
7. What is the number of straight lines in the following figure?



- (a) 11 (b) 14 (c) 16 (d) 17
8. Determine the number of pentagons in the following figure?

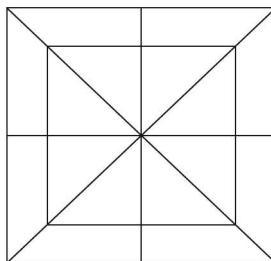


- (a) 5 (b) 6 (c) 8 (d) 10

[SSC]

[Hotel Management]

9. What is the number of triangles and squares in the following figure?



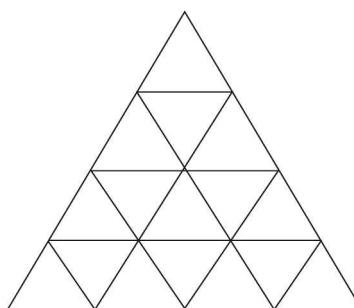
(a) 28 triangles, 10 squares

(c) 32 triangles, 10 squares

(b) 28 triangles, 8 squares

(d) 32 triangles, 8 squares

10. How many straight lines are there in the following figure?



(a) 9

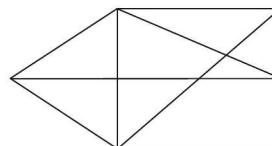
(b) 11

(c) 15

(d) 48

11. How many triangles are there in the following figure?

[SSC]



(a) 12

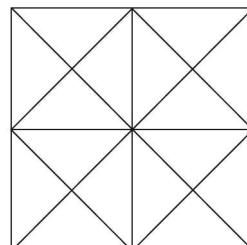
(b) 13

(c) 14

(d) 15

12. How many triangles and squares are there in the given figure?

[Railways]



(a) 44 triangles, 10 squares

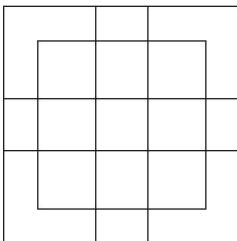
(c) 24 triangles, 6 squares

(b) 14 triangles, 16 squares

(d) 24 triangles, 9 squares

13. How many squares does the following figure contain?

[Hotel Management]



(a) 18

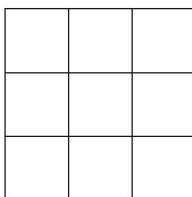
(b) 19

(c) 25

(d) 27

14. The maximum number of squares in the following figure is _____.

[Railways]



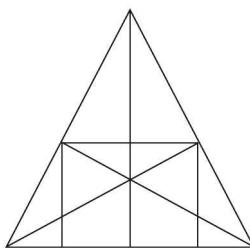
(a) 14

(b) 13

(c) 10

(d) 9

15. What is the number of straight lines and the number of triangles in the given figure?



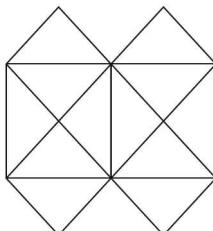
(a) 10 straight lines and 34 triangles

(b) 9 straight lines and 34 triangles

(c) 9 straight lines and 36 triangles

(d) 10 straight lines and 36 triangles.

Directions: Study the following figure and answer the questions (16 to 18).



16. What is the minimum number of straight lines that is needed to construct the figure?

(a) 11

(b) 13

(c) 15

(d) 21

17. Count the number of triangles in the figure

(a) 12

(b) 16

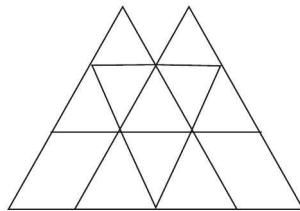
(c) 20

(d) 24

18. How many squares does the figure contain?

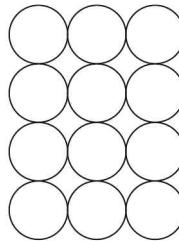
- (a) 5 (b) 6 (c) 7 (d) 8

19. Count the number of triangles and parallelogram in the figure given below.



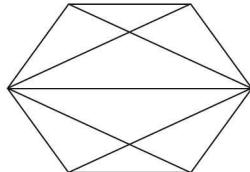
- (a) 16, 22 (b) 18, 23 (c) 14, 20 (d) 15, 21

20. In the following figure, if the centres of all the circles are joined by horizontal and vertical lines, then find the number of squares that can be formed.



- (a) 6 (b) 7 (c) 8 (d) 10

Directions: Analyse the following figure and answer the questions (21 and 22).



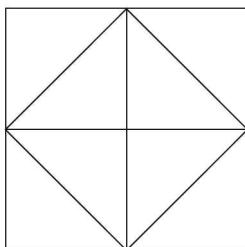
21. Find the number of quadrilaterals

- (a) 5 (b) 7 (c) 9 (d) 10

22. Find the number of pentagons

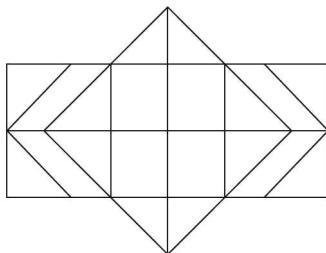
- (a) 2 (b) 3 (c) 4 (d) 6

23. Count the number of pentagons in the following figure



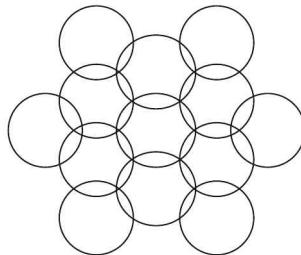
- (a) 16 (b) 14 (c) 12 (d) 10

24. Determine the number of rectangles and hexagons in the following figure.



- (a) 8 rectangles, 3 hexagons (b) 15 rectangles, 3 hexagons
 (c) 24 rectangles, 5 hexagons (d) 30 rectangles, 5 hexagons

25. How many circles are there in the figure given below?



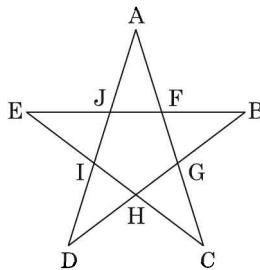
- (a) 11 (b) 12 (c) 13 (d) 14

ANSWERS

- | | | | | | | | | | |
|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| 1. (d) | 2. (d) | 3. (e) | 4. (b) | 5. (d) | 6. (a) | 7. (b) | 8. (d) | 9. (c) | 10. (b) |
| 11. (d) | 12. (a) | 13. (d) | 14. (a) | 15. (c) | 16. (b) | 17. (c) | 18. (c) | 19. (b) | 20. (c) |
| 21. (c) | 22. (d) | 23. (c) | 24. (d) | 25. (c) | | | | | |

Explanations

1. The given figure can be represented as shown below.



The simplest triangles are AJF, BFG, CGH, DHI and EIJ i.e. in total 5 numbers.

The triangles having 3 components are AIC, ADG, BEH, BJD and CFE i.e. in total 5 numbers.

∴ Total number of triangles = 5 + 5 = **10**.

2. The given figure can be labelled as follows:

The simplest triangles are AFE, EFC, CFD, DFB and BFA i.e. 5 numbers.

The triangles having two components are AFC, CFB, ABD and EAB i.e. 4 numbers.

The triangles having three components are ADC and EBC i.e. 2 numbers.

The triangles having five components is ABC i.e. 1 number.

So total number of triangles = $5 + 4 + 2 + 1 = 12$

3. The figure can be labelled as follows:

The simplest squares are ABGF, BCHG, DIHC, EJID, FGLK, GHML, GLKF, OTSN, NSRM, MRQL, LQPK, TYXS, SXWR, RWVQ and QVUP i.e. 16 numbers.

The squares composed of four simple squares are ACMK, DNLB, EOMC, HRPF, ISQG, JTRH, KMWU, LNXV and MOYW i.e. 9 numbers.

The squares composed of nine simple squares are ADSP, BETQ, FIXU and GJYV i.e. 4 numbers.

The square composed of sixteen simple squares is AEYU i.e. 1 number.

\therefore Total number of squares = $16 + 9 + 4 + 1 = 30$

4. The figure can be labelled as follows:

The simplest triangles are ABG, BCG, CDE, GCE, AGE and EFA i.e. 6 numbers.

The triangles composed of two triangles each are ABC, ABE, BCE and ACE i.e. 4 numbers.

\therefore There are $6 + 4 = 10$ triangles.

5. The given figure can be labelled as follows:

The simplest rectangles are BCJI, CDEJ, EFGJ and JGHI i.e. 4 numbers.

The rectangles having two components are BDEI, EFHI, CDFG and BCGH i.e. 4 numbers. The only rectangle composed of four components is BDFH.

\therefore Total number of rectangles = $4 + 4 + 1 = 9$

6. The figure can be labelled as follows:

The simplest triangles are GKL, MNH, DLJ, DJM, QRE, OFP, PAI and RIA i.e. 8 numbers.

The triangles having two components each are BOD, CDQ, ENI, RPA, IKF, HJI, JGI, DLM, KPI and DKI i.e. 10 numbers.

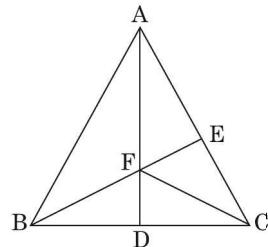
The triangles having four components each are DIE, DFI, DOA, DAQ and HGI i.e. 5 numbers.

The triangles having six components each are DBA and CDA i.e. 2 numbers.

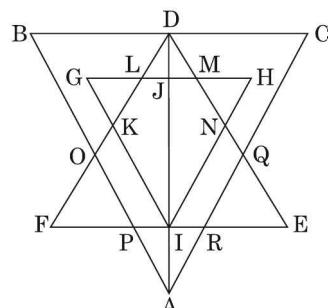
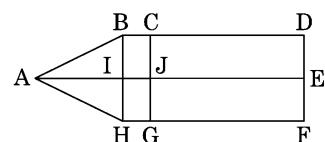
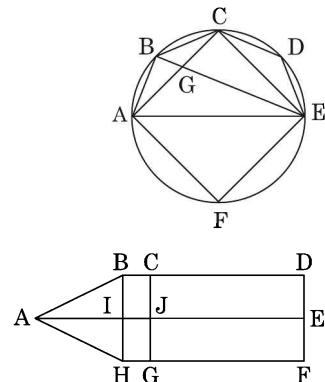
Only triangle having eight components is DEF.

The only triangle having twelve components is ABC

\therefore Total number of triangles = $8 + 10 + 5 + 2 + 1 + 1 = 27$



| | | | | |
|---|---|---|---|---|
| A | B | C | D | E |
| | G | H | I | |
| F | L | M | N | J |
| K | | | | O |
| P | Q | R | S | T |
| U | V | W | X | Y |



7. The given figure may be labelled as follows:

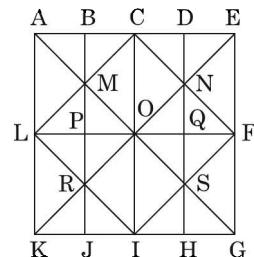
There are 3 horizontal lines, namely AE, LF and KG.

There are 5 vertical lines i.e. AK, BJ, CI, DH and EG.

There are 6 slanting lines i.e. AG, KE, LC, CF, LI and IF.

\therefore Total number of straight lines = $3 + 5 + 6 = 14$.

\therefore The answer is (b)



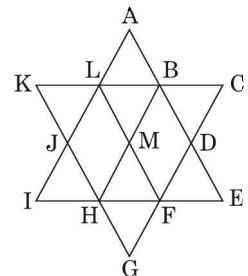
8. The figure may be labelled as follows:

Here six pentagons are there having three triangles and two rhombuses as components: i.e. AJHFD, KHFDB, IFDBL, GDBLJ, EBLJH and CLJHF.

Four pentagons are formed which are composed of three triangles and one rhombus.

i.e. LCFHM, BEHML, KHFMB, and IFMBL

\therefore Total number of pentagons = $6 + 4 = 10$.



9. The figure may be labelled as follows:

Triangles

The simplest triangles are IJQ, JKQ, KLQ, LMQ, MNQ, NOQ, OPQ and PIQ i.e. 8 numbers.

Triangles composed of two components are ABQ, BCQ, CDQ, DEQ, EFQ, FGQ, GHQ, HAQ, IKQ, KMQ, MOQ and OIQ i.e. 12 numbers.

The triangles composed of four components are ACQ, CEQ, EGQ, GAQ, MOI, OIK, IKM and KMO i.e. 8 numbers.

The triangles composed of eight components are ACE, CEG, EGA and GAC i.e. 4 numbers.

Therefore, total number of triangles = $8 + 12 + 8 + 4 = 32$.

Squares

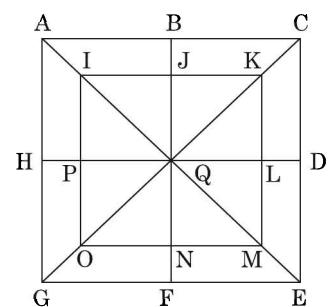
The squares composed of two components are IJQP, JKLQ, LMNO and NOPQ i.e. 4 numbers.

The squares composed of four components are ABQH, BCDQ, DEFQ and QFGH i.e. 4 numbers.

The only square composed of eight components is IKMO.

Only square composed of sixteen components is ACEG.

\therefore Total number of squares = $4 + 4 + 1 + 1 = 10$.

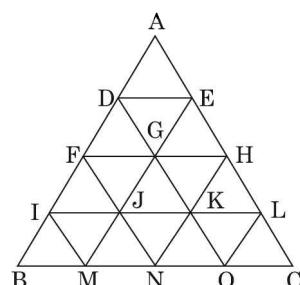


10. The figure may be labelled as follows:

The horizontal lines are DE, FH, IL and BC i.e., 4 numbers.

The slanting lines are IM, FN, DO, AC, AB, ME and NH i.e. 7 numbers.

\therefore Total number of lines is $4 + 7 = 11$.



11. The figure may be labelled as follows:

The simplest triangles are AFE, ABF, BCI, CHI, GIH and FGE i.e. 6 numbers.

The triangles composed of two components are ABE, BHF, BIE, BCH, CHG and AGE i.e. 6 numbers.

The triangles composed of three components are ABH, BCE and CDE i.e. 3 numbers.

Hence total number of triangles = $6 + 6 + 3 = 15$.

12. The figure may be labelled as follows:

Triangles

The simplest triangles are AFI, FBJ, BGJ, JGO, FJO, OGK, GCK, KCH, OKH, OHL, LHD, ELD, EOL, IOE, FOI and AIE i.e. 16 numbers.

The triangles having two simple triangles each are AFE, AFO, FOE, AOE, FBG, BGO, GOF, OFB, OGC, GCH, CHO, HOG, EOH, OHD, HDE and DEO i.e. 16 numbers.

The triangles having four simple triangles each are AOB, BOC, COD, DOA, GFE, FEH, EHG and GFH i.e. 8 numbers.

The triangles having eight simple triangles each are ABC, BCD, CDA and DAB i.e. 4 numbers.

∴ Number of triangles in the figure = $16 + 16 + 8 + 4 = 44$.

Squares

The squares containing two triangles each are FJOI, JGKO, KHLO and OLEI i.e. 4 numbers.

The squares containing four triangles each are AFOE, FBGO, OGC and OHDE i.e. 4 numbers.

The square containing eight triangles is EFGH.

The square containing sixteen triangles is ABCD.

∴ Total number of squares = $4 + 4 + 1 + 1 = 10$.

13. The figure may be labelled as follows:

The simplest squares are EFRQ, RNSZ, SGHT, QRZY, MQYX, A₁TOU, B₁A₁UV, VUIJ, WB₁VP, XYB₁W, YZA₁B₁ and ZSTA₁ i.e. 13 numbers.

The squares having two components each are AEYL, FBGZ, A₁HCI and KB₁JD i.e. 4 numbers.

The squares having four components each are XZUP, YSOV, QNTB₁, and MRA₁W i.e. 4 numbers.

The squares having seven components each are AFA₁K, EBHB₁, YGCJ and LYJD i.e. 4 numbers.

The square having nine components is MNOP.

The square having seventeen components is ABCD.

∴ Total number of squares = $13 + 4 + 4 + 4 + 1 + 1 = 27$.

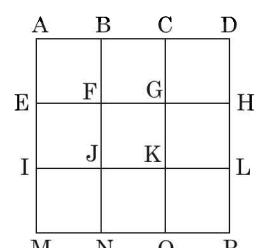
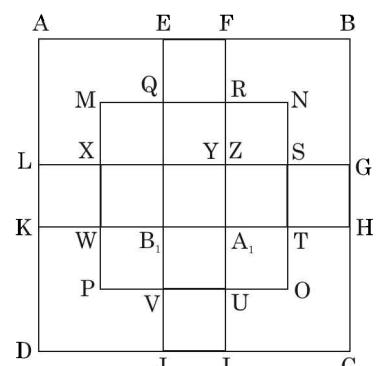
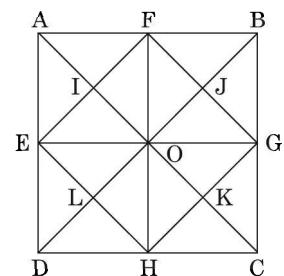
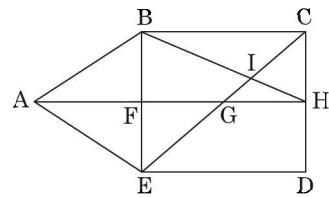
14. Given figure is labelled as follows:

The simplest squares are ABFE, BCGF, CDHG, HLKG, GKJF, FJIE, LPOK, KONJ and JNMI i.e. 9 numbers.

The squares composed of four components are ACKI, BDLJ, EGOM and FHPN i.e. 4 numbers.

The square composed of nine components is ADPM.

∴ Total number of squares = $9 + 4 + 1 = 14$



15. The given figure may be labelled as follows:

The horizontal lines are DF and BC i.e. 2 numbers.

The vertical lines are DG, AH and FI i.e. 3 numbers.

The slanting lines are DC, BF, AB and AC i.e. 4 numbers.

\therefore Total number of straight lines = $2 + 3 + 4 = 9$ numbers.

The simplest triangles are AED, AFE, DEK, EFK, DKJ, KFL, DJB, FCL, BJC, and LCI i.e. 10 numbers.

The triangles composed of two components each are AFD, DFK, AKD, AFK, KFC, DKB, FCI, DGB, BKH and KCH i.e. 10 numbers.

The triangles composed of three components each are DFJ and DFL i.e. 2 numbers.

The triangles composed of four components each are AKB, ACK, BKC, BDF, DFC, DGC and FIB i.e. 7 numbers.

The triangles composed of six components each are AHB, AHC, DAC, DFB, BDC and BFC i.e. 6 numbers.

The triangle composed of twelve components is ABC.

\therefore Total number of triangles = $10 + 10 + 2 + 7 + 6 + 1 = 36$

16. The figure may be labelled as follows:

The straight lines are:

Horizontal: AE and JF i.e. 2 numbers.

Vertical: AJ, CH and EF i.e. 3 numbers.

Slanting: JI, AG, BF, DE, AB, DJ, EI and FG i.e. 8 numbers.

i.e. Total number of straight lines = $2 + 3 + 8 = 13$

17. The simplest triangles in the given figure are ABC, CDE, ACK, CEL, AKJ, CHK, JKH, CLH, EFL, LFH, FGH and HIJ i.e. 12 numbers.

The triangles composed of two components are AHJ, ACH, CFH, CEH, ACJ, CHJ, EFH and CEF i.e. 8 numbers.

Total number of triangles in the given figure = $12 + 8 = 20$

18. The squares composed of two components are ABCK, CDEL, LFGH, HIJK and CLHK i.e. 5 numbers.

The squares composed of four components are ACHJ and CEFH i.e. 2 numbers.

\therefore Number of squares = $5 + 2 = 7$

19. The figure may be represented as follows:

Triangles

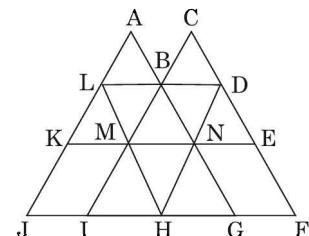
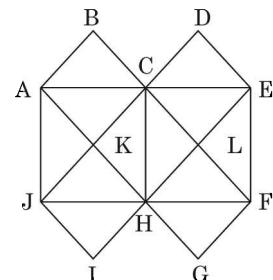
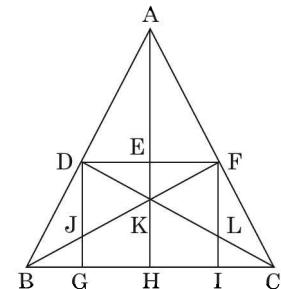
The simplest triangles are ABL, CDB, BML, DNB, KLM, MBN, NDE, IMH, MNH and NGH i.e. 10 numbers.

The triangles composed of three components are LHJ and DFH i.e. 2 numbers.

The triangles composed of four components are: ANK, CEM, BGI and HLD i.e. 4 numbers.

The triangles composed of eight components are AGJ and CFI i.e. 2 numbers.

\therefore Total number of triangles = $10 + 2 + 4 + 2 = 18$.



Parallelograms

The simplest parallelograms are KMIJ and NEFG i.e. 2 numbers.

The parallelograms composed of two components are BMKL, BNML, BDEN, BDNM, MNHI, MNGH, BNHM, ABML and CNDN i.e. 9 numbers.

The parallelograms composed of three components are KNHJ, MEFH, LBIJ and BDFG i.e. 4 numbers.

The parallelograms composed of four components are ANHL, CDHM, LBGH, BDHI, LDNK and LDEM i.e. 6 numbers.

The parallelograms composed of seven components are LDFH and LDHJ i.e. 2 numbers.

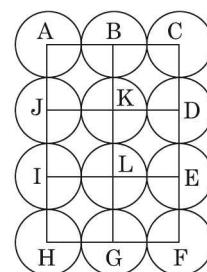
$$\therefore \text{Total number of parallelogram} = 2 + 9 + 4 + 6 + 2 = 23.$$

20. The centres of all the circles are joined and all the vertices are labelled as follows:

The simplest squares are ABKJ, BCDK, JKLI, KDEL, ILGH and LEFG i.e. 6 numbers.

The squares composed of four simple squares each are ACEI and JDFH i.e. 2 numbers.

$$\text{Thus, total number of squares formed} = 6 + 2 = 8.$$



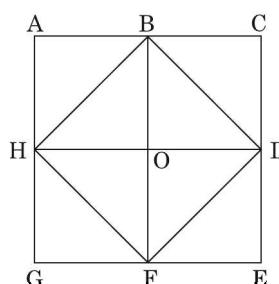
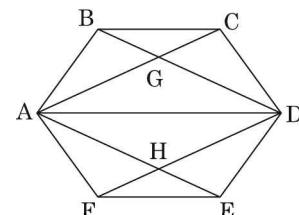
21. The figure may be labelled as follows:

The quadrilaterals in the figure are ABDE, ABDF, ACDF, ACDE, ACDH, AGDH, ABDH, AGDE and AGDF.

$$\therefore \text{Total number of quadrilaterals} = 9$$

22. The pentagons in the above figure are ABCDE, CDEFA, DEFAB, FABCD, AGDEF and ABCDH i.e. 6 numbers.

23. The figure may be labelled as follows:



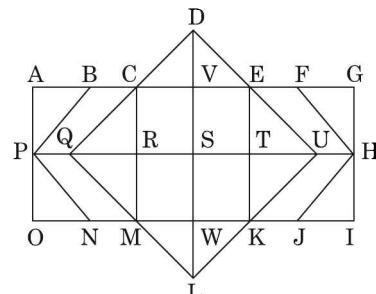
The pentagons in the above figure are ABDFH, BCDFH, DEFHB, FGHBD, ABDFG, GHBD, ACDFH, BCEFH, GABDE, GACDF, HACEF and BCEGH i.e. 12 numbers.

24. The simplest rectangles are CVSR, VETS, STKW and RSWM i.e. 4 numbers.

The rectangles having two components each are: CVWM, VEKW, CETR and RTKM i.e. 4 numbers.

The rectangles having three components each are: ACRP, PRMO, EGHT and THIK i.e. 4 numbers.

The rectangles having four components each are: AVSP, PSWO, CEKM, VGHS and SHIW i.e. 5 numbers.



The rectangles having five components each are AETP, PTKO, CGHR and RHIM i.e. 4 numbers.

The rectangles having six components each are ACMO and EGIK i.e. 2 numbers.

The rectangles having eight components each are AVWO, VGIW, AGHP and PHIO i.e. 4 numbers.

The rectangles having ten components each are: AEKO and CGIM i.e. 2 numbers.

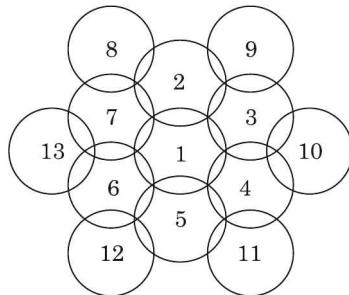
The rectangle having sixteen components each is AGIO.

∴ Total number of rectangles = $4 + 4 + 4 + 5 + 4 + 2 + 4 + 2 + 1 = 30$.

The hexagons in the given figure are CEUKMQ, BFHJNP, CDEKLM, CFHJM, and BEUKNP i.e. 5 numbers.

Total number of hexagons = 5.

25. The given figure may be labelled as follows:



Total number of circles = 13.

Problems on Cubes and Dice

In this chapter you will be given with a dice marked from 1 to 6 in different faces placed in 4 or 5 positions. You have to identify the face coming opposite to a specified face or a face coming in between two different specified faces.

Or you will be given with a cube painted with different colours in different faces. If the cube is cut into smaller cubes. You have to find out the number of cubes, which are:

- (i) at least one face painted
- (ii) at least two faces painted
- (iii) at least three faces painted
- (iv) no faces painted, etc.

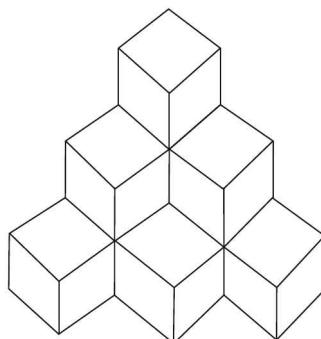
PROBLEMS ON DICE: In this test, you are given figures showing the same die in different positions. Study the figures carefully and you have to find the number opposite a given number on the die.

PROBLEMS ON CUBES: In this test, you have to study the given figure carefully and answer the questions that follow. You may have to find either of the following:

- (i) Count the number of cubes.
- (ii) Count the number of cubes that are painted with one or more particular colour.
 - (a) in one face only, (b) in more than one faces
- (iii) Find the colour of a face which is opposite to another face painted with a particular colour.
- (iv) Count the number of cubes with specific number of faces painted.
- (v) (a) no face painted, (b) one face painted, (c) two faces painted, (d) three faces painted, (e) four faces painted, (f) five faces painted, (g) all faces painted

EXAMPLE 1 Find the number of cubes in the given figure.

[IAS]



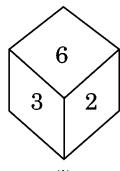
Solution There are three columns containing 1 cube each, two columns containing 2 cubes each and one column containing 3 cubes.

∴ Total number of cubes in the figure = $3 \times 1 + 2 \times 2 + 1 \times 3 = 3 + 4 + 3 = 10$.

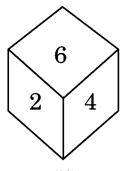
EXERCISES

Observe the figures carefully and find the number opposite a given number on the dice.

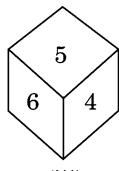
1. Consider the following pictures of a dice.



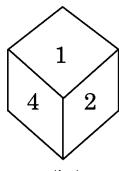
(i)



(ii)



(iii)



(iv)

What is the number opposite to 3?

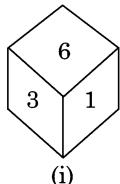
(a) 1 (b) 4

(c) 5

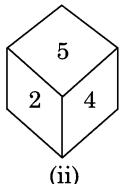
(d) Data insufficient

2. The number opposite to 3 is

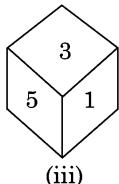
[IAS]



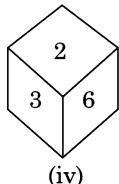
(i)



(ii)



(iii)



(iv)

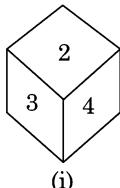
(a) 2

(b) 3

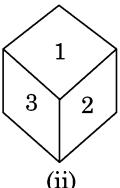
(c) 4

(d) 6

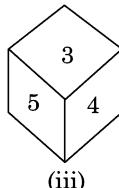
3. A die is thrown four times and its four different positions are given below. Find the number on the face opposite the face showing 2.



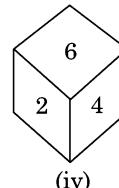
(i)



(ii)



(iii)



(iv)

(a) 3

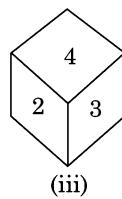
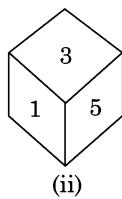
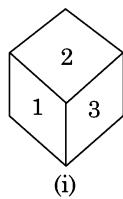
(b) 4

(c) 5

(d) 6

9. What should be the number opposite 3?

[IAS]



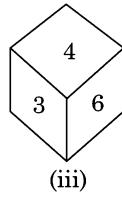
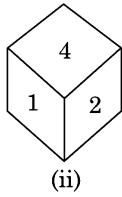
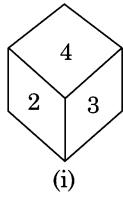
(a) 1

(b) 6

(c) 5

(d) 4

10. What numbers occur at the bottom face in the three positions of the same die?



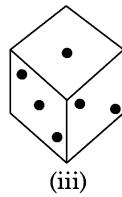
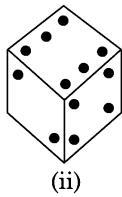
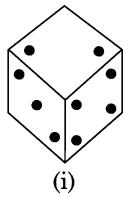
(a) 6, 6, 2

(b) 5, 6, 1

(c) 5, 5, 5

(d) 6, 5, 2

11. Find the number of dots on the face opposite the face bearing 3 dots.



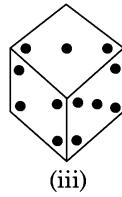
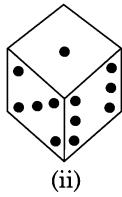
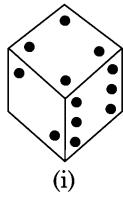
(a) 5

(c) 4

(b) 6

(d) Cannot be determined

12. How many dots lie opposite 2 dots?



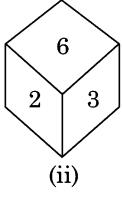
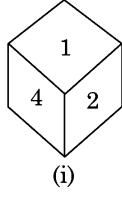
(a) 1

(b) 3

(c) 5

(d) 6

13. What will be the number at the bottom if 5 is at the top; the two positions of the dice being as given below.



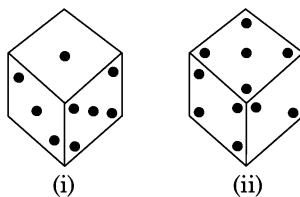
(a) 1

(b) 2

(c) 3

(d) 6

14. What is the number of dots on the face opposite 2 dots?



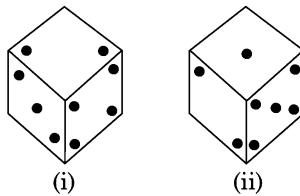
(a) 1

(b) 3

(c) 4

(d) 6

15. What is the number of dots at the bottom face of the left hand side dice?



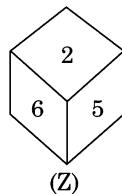
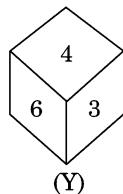
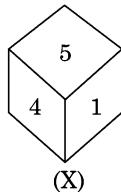
(a) 3

(b) 4

(c) 5

(d) 6

16.



(i) Which number lies at the bottom face of the die X?

(a) 1

(b) 2

(c) 3

(d) 4

(ii) Which number lies at the bottom face of the die Y?

(a) 6

(b) 5

(c) 2

(d) 1

(iii) Which number lies opposite 6?

(a) 1

(b) 2

(c) 4

(d) 5

(iv) Which numbers are hidden behind the numbers 6 and 5 in the die Z?

(a) 1 and 4

(b) 1 and 3

(c) 4 and 3

(d) 1 and 2

(v) Which of the hidden numbers adjacent to 5 in die X are common to the hidden numbers adjacent to 5 in die Z?

(a) 1 and 4

(b) 2

(c) 6

(d) None of these

ANSWERS

- | | | | | | | | | | |
|---------|---------|---------|---------|---------|-------------|----------|-----------|----------|---------|
| 1. (b) | 2. (c) | 3. (c) | 4. (c) | 5. (a) | 6. (c) | 7. (a) | 8. (a) | 9. (b) | 10. (c) |
| 11. (b) | 12. (c) | 13. (b) | 14. (b) | 15. (d) | 16. (i) (c) | (ii) (c) | (iii) (a) | (iv) (b) | (v) (d) |

Explanations

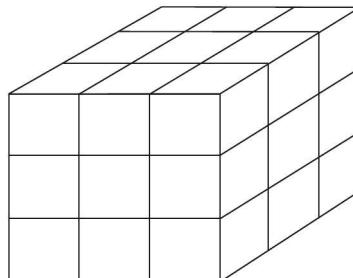
2. From figure (i), (iii) and (iv) it is clear that the numbers 6, 1, 5 and 2 lie adjacent to 3. So, 4 lies opposite 3.

3. From figure (i) and (iv) 3 is opposite to 6. From figure (i) and (ii) 1 is opposite to 4. So number opposite to 2 is 5.
4. From figure (i) and (iii), 4 is opposite to face showing 6.
5. From figure (ii) and (iv) 1 is opposite to face showing 6.
6. From figure (i) and (iii) number opposite 3 is 4.
7. From figure (iii) and (iv) face opposite 4 is 1.
8. From figure (ii) and (iii) face opposite 4 is 1.
9. From figure (i), (ii) and (iii), face opposite 3 is 6.
10. From figure (i), (ii) and (iii) 1, 2, 3 and 6 appears on sides of dice and 4 appears on top. So number at bottom on each dice is 5. i.e. 5, 5, 5.
11. From figure (i) and (iii) 1 dot appears opposite 4. From figure (ii) and figure (i), 6 appears opposite to 3.
12. From figure (i) and (ii), 5 lies opposite 2.
13. From figure (i) and (ii) number opposite to 2 is 5.
i.e. if 5 is at the top, number at bottom will be 2.
14. From figure (i) and (ii) 3 dots lies opposite 2.
15. From figure (i) and (ii), 3, 4, 5 and 1 lies by the side of 2. So 6 lies opposite to 2 i.e. bottom of the left hand side dice.
16. (i) From figure (X) and (Z), 4, 1, 6 and 2 lies by the side of 5. So number lies at the bottom face of die X is 3.
(ii) From figure (X) and (Y), 1, 5, 6 and 3 lies by the side of 4. So number that lies at bottom face of Y is 2.
(iii) From figure (Y) and (Z), 2, 5, 4 and 3 lies by the side of 6. So number opposite to 6 is 1.
(iv) From figure (Y) and (Z), number 1 is opposite to 6. From figure (X) and (Z), number 3 is opposite to 5.
 \therefore So 1 and 3 is the answer.
(v) From figure (X) and (Z), number adjacent to 5 are 4, 1, 2 and 6. No numbers are in common to dice X and Z which are hidden and adjacent to 5.

PAINTING A STACK OF CUBES

EXERCISES

Directions: A wooden cube is painted blue on all the four adjoining sides and green on two opposite sides, i.e. top and bottom. It is then cut at equal distances at right angles four times vertically (top and bottom) and two times horizontally (along the sides) as shown in the figure. Study the diagram and answer the following questions:



1. How many cubes will have one face painted only in blue?
 (a) 1 (b) 2 (c) 3 (d) 4 (e) 5
2. How many cubes will have one face painted only in green?
 (a) 1 (b) 2 (c) 3 (d) 4 (e) 5
3. How many cubes are formed in all?
 (a) 16 (b) 24 (c) 27 (d) 32 (e) 48
4. How many cubes will have at least three sides painted?
 (a) 8 (b) 6 (c) 3 (d) 2 (e) 1
5. How many cubes will have no face painted at all?
 (a) 1 (b) 2 (c) 3 (d) 4 (e) 5

Directions (6–8): A cube is painted blue on all faces is cut into 125 cubes of equal size. Now, answer the following questions. [MBA]

6. How many cubes are not painted on any face?
 (a) 8 (b) 16 (c) 18 (d) 27 (e) 54
7. How many cubes are painted on one face only?
 (a) 8 (b) 16 (c) 36 (d) 54 (e) None of these
8. The minimum number of colours required to paint all the sides of a cube that no two adjacent faces may have the same colour is
 [MBA]
 (a) 1 (b) 2 (c) 3 (d) 4 (e) 6

Directions (9–13): A cube painted red on two adjacent faces and black on the faces opposite to the red faces and green on the remaining faces is cut into 64 smaller cubes of equal size.

[CBI]

9. How many cubes are there which have no faces painted?
 (a) 0 (b) 4 (c) 8 (d) 16
10. How many cubes have only one face painted?
 (a) 8 (b) 16 (c) 24 (d) 32
11. How many cubes have less than 3 faces painted?
 (a) 8 (b) 24 (c) 28 (d) 48
12. How many cubes are there with three faces painted?
 (a) 4 (b) 8 (c) 16 (d) 24
13. How many cubes have one face green and one of the adjacent faces black or red?
 (a) 8 (b) 16 (c) 24 (d) 28

Directions (14–20): A solid cube of each side 8 cm has been painted red, blue and black on pairs of opposite faces. It is then cut into cubical blocks of each side 2 cm.

14. How many cubes have no faces painted?
 (a) 0 (b) 4 (c) 8 (d) 12
15. How many cubes have three faces painted with different colours?
 (a) 0 (b) 4 (c) 8 (d) 12
16. How many cubes have two faces painted red and black and all other faces unpainted?
 (a) 4 (b) 8 (c) 16 (d) 32
17. How many cubes have two faces painted black?
 (a) 2 (b) 4 (c) 8 (d) None of these

18. How many cubes have one face painted blue and one face painted red? (the other faces may be painted or not painted)
 (a) 16 (b) 12 (c) 8 (d) 0
19. How many cubes have only one face painted red and all other faces unpainted?
 (a) 4 (b) 8 (c) 12 (d) 16
20. How many cubes have three faces painted?
 (a) 0 (b) 4 (c) 6 (d) 8

ANSWERS

1. (d) 2. (b) 3. (c) 4. (a) 5. (a) 6. (d) 7. (d) 8. (c) 9. (c) 10. (c)
 11. (d) 12. (b) 13. (c) 14. (c) 15. (c) 16. (b) 17. (d) 18. (a) 19. (b) 20. (d)

Explanations

Note: The figure may be analyzed by dividing it into three horizontal layers.

1. There are four cubes in the middle layer, which have one face painted only in blue.
2. There is only one cube each at top and bottom layer which has one face painted only in green.
3. There are 9 cubes in each layer. Therefore, altogether in all the three layers there are 27 cubes.
4. Four cubes in the top layer and four cubes in the bottom layer have three sides painted. Hence there are 8 such cubes.
5. There is only one central cube in the middle layer, which has no faces painted at all.
6. There will be 5 cubes width for the given large cube as length, width and depth. So in the middle layers there will be $3 \times 3 = 9$ cubes/layer. So in all, there will be $9 \times 3 = 27$ cubes unpainted on all faces.
7. Number of cubes which are one side painted – 9 cubes at top + 9 cubes at bottom + (12 cubes/layer \times 3 for middle layers).
 \therefore Total number of cubes with only one face painted = $9 + 12 \times 3 + 9 = 54$.
8. Adjacent faces are avoided for same colours, opposite faces may be provided with same colours. So as a cube is having 3 pair of faces, minimum number of colours required to paint all sides of cube = 3.
9. There are 8 cubes with no face painted.
10. There are 24 cubes having only one face painted.
11. There are 24 cubes having only one face painted and 24 cubes having only two faces painted. So the number of cubes having less than 3 faces painted = $24 + 24 = 48$.
12. There are 8 cubes having three faces painted.
13. There are $8 + 4 + 4 + 8 = 24$ such cubes which have one face green and one of the adjacent faces black or red.
14. Four central cubes each in 2 middle layers have no face painted. i.e. total number of such cubes = 8.
15. Four corners cubes in top and bottom layers have three faces painted with different colours. Thus, there are 8 such cubes.
16. There are four cubes in top layer and four cubes in bottom layer which have two faces painted red and black and all other faces unpainted. So, there are 8 such cubes.

17. There will be no cubes which have two of its faces both painted black. So number of cubes = 0. The answer is (d).
18. There are 8 cubes in top layer and 8 cubes in bottom layer which have one face painted blue and one face painted red. So, the total number of such cubes = $8 + 8 = 16$.
19. There are 4 cubes in top layer and 4 cubes in bottom layer which have only one face painted red and all other faces unpainted.
∴ Total number of such cubes = $4 + 4 = 8$.
20. Four corner in top layer and four corner cubes in bottom layer have faces painted. So there are 8 such cubes.

Mirror Images

Image of an object, as seen in a mirror, is called the *mirror image* or *mirror reflection*.

The right side of an object appears on the left side in its image and vice versa. Phenomenon of getting a letter inverted in its mirror image is called the *lateral inversion*.

Note: Letters having identical mirror images are : A H I M O T U V W X and Y

EXAMPLE 1 Find out the mirror image of the word ‘SECOND’.

| <i>Object</i> | | <i>Image</i> |
|---------------|--|--------------|
| SECOND | | SECOND |

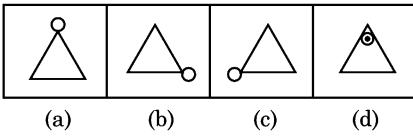
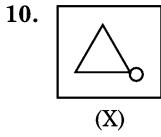
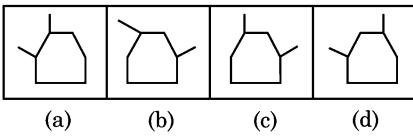
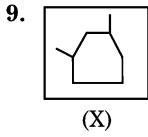
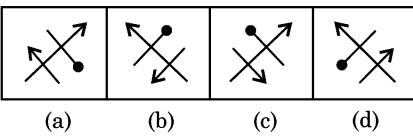
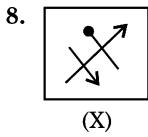
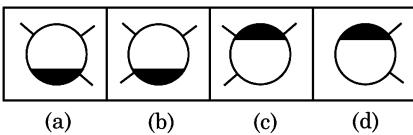
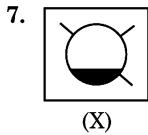
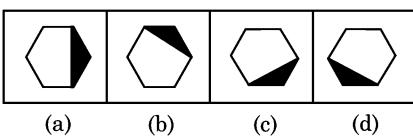
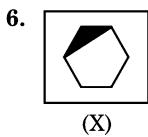
Image of word SECOND will be as seen on the right side after dotted line.

EXERCISES

Directions (Q. 1–5): In each of the following questions, you are given a combination of letters or/and numbers followed by four alternatives (a), (b), (c) and (d). Choose the alternative which most closely resembles the mirror-image of the given word.

1. ABILITY
(a) YTILIBA (b) AILTINY (c) YTIILBA (d) LITYABI
2. 97563
(a) 63975 (b) 36579 (c) 67386 (d) 67386
3. mineral
(a) eralmin (b) mineral (c) minrale (d) larenim
4. A1B2C3
(a) 3C2B1A (b) 2C3A1B (c) ATB3C3 (d) BTA3C3
5. GANDHI1948
(a) GANDHI1948 (b) 1948 GANDHI
(c) 8491IHDNAG (d) IHDNAG8491

Directions (Q. 6–10): In each one of the following questions, choose the correct mirror-image of the figure (X) from among the four alternatives (a), (b), (c) and (d) given along with it.



ANSWERS

1. (c) 2. (d) 3. (b) 4. (c) 5. (a) 6. (b) 7. (b) 8. (b) 9. (c) 10. (c)

Water Images

The reflection of an object as seen in water is called its **water image**. It is the inverted image obtained by turning the object upside down.

Note: The letters whose water images remain unchanged are: C, D, E, H, I, K, O, and X.

EXAMPLE 1 Find out the water image of the word ‘SERIES’.

- (a) SERIES (b) SERIES (c) SERIES (d) IESSER

The answer is (b).

EXERCISES

Directions: In each one of the following questions, you are given a combination of letters or/and numbers followed by four alternatives (a), (b), (c), and (d). Choose the alternative which most clearly resembles the water image of the given combination.

1. NEW DELHI

- (a) DEGHI WEN (b) DELHI NEW (c) WEN DEGHI (d) IHGED WEN

2. escape

- (a) ebscae (b) sbeesc (c) cseepa (d) escaeb

3. 15 AUG 1947

- (a) 15 AUG 1947 (b) 1947 15 AUG (c) 15 AUG 1947 (d) 1947 AUG 15

4. PERMANENT

- (a) MEEPTNENA (b) 3EAMANNT (c) MRPEPNENA (d) TNENAMNEE

5. NEHRU 1964

- (a) UREHN 1964 (b) NEHRU 1964 (c) UREHN 1964 (d) 1964 UREHN

ANSWERS

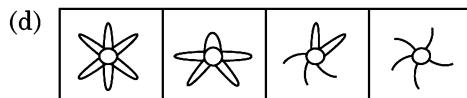
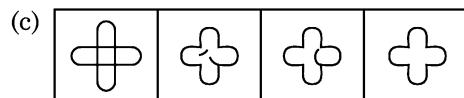
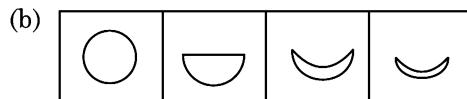
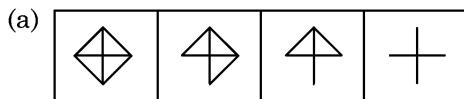
1. (c) 2. (d) 3. (b) 4. (d) 5. (d)

Rule Detection

In this chapter, we will solve problems in which a particular rule is given and it is required to select from the given sets of figures, a set of figures which obeys the rule and thus forms a series.

EXAMPLE 1 Which one of the given sets of figures satisfies the following rule?

Rule: Closed figure becomes more and more open.

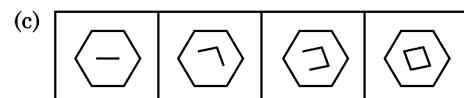
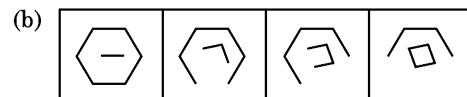
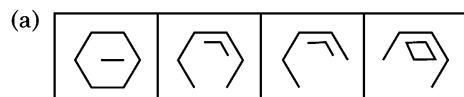


Solution The answer is (a).

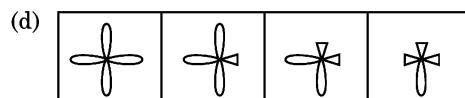
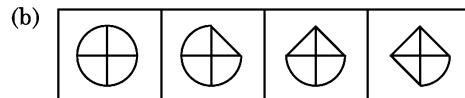
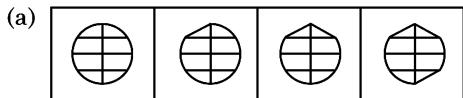
EXERCISES

Directions: In each of the following questions, choose the set of figures which follows the given rule.

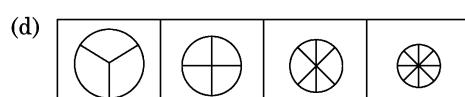
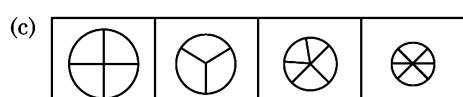
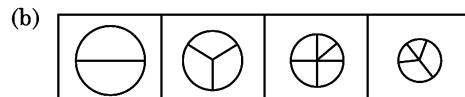
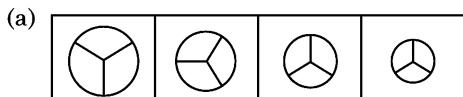
1. Rule: Closed figures losing their sides and open figures gaining their sides.



2. Rule: Sectors get converted to triangles one by one.



3. Rule: As the circle decreases in size, its sector increases in number.



ANSWERS

1. (b) 2. (b) 3. (d)

Model Test Paper 1

1. Find the least number which, upon being divided by 2, 3, 4, 5 and 6 leaves in each case a remainder of 1, but when divided by 7 leaves no remainder.
(a) 271 (b) 291 (c) 301 (d) 311 (e) None of these
2. What is the greatest number that will divide 676 and 942 and will leave remainders 4 and 18 respectively?
(a) 64 (b) 46 (c) 24 (d) 42 (e) None of these
3. The sum of two numbers is 528 and their HCF is 33. How many pairs of such numbers can be formed?
(a) 1 (b) 2 (c) 3 (d) 4 (e) None of these
4. The product of two numbers is 2646 and their HCF is 21. Find the number of possible pair of numbers.
(a) 1 (b) 2 (c) 3 (d) 4 (e) None of these
5. Find the value of $\frac{1}{2 + \frac{1}{3 + \frac{1}{1 + \frac{1}{4}}}} =$
(a) $\frac{17}{43}$ (b) $\frac{18}{43}$ (c) $\frac{19}{43}$ (d) $\frac{21}{43}$ (e) None of these
6. A person is having some amount with him. He gave 1/3rd of the amount as loan to A and took back 54 more. He gave 1/2 of the amount with him as loan to B and took back 25 more. When he met C, the amount left was ₹ 262. What was the amount with the person when he met A?
(a) 620 (b) 640 (c) 630 (d) 650 (e) None of these

7. How many number of five digits can be formed with the digits 0, 1, 2, 4, 6 and 8?
 (a) 800 (b) 600 (c) 500 (d) 400 (e) None of these
8. There are five students P, Q, R, S, and T. In how many ways can they sit so that Q and R do not sit together?
 (a) 120 (b) 48 (c) 66 (d) 72 (e) None of these
9. From a pack of 52 playing cards 2 cards are drawn. What is the probability that it has one ace and one jack?
 (a) $\frac{4}{663}$ (b) $\frac{8}{663}$ (c) $\frac{16}{663}$ (d) $\frac{32}{663}$ (e) None of these
10. There are twenty students in a class. If 8 of them are girls and a team of 2 boys and 2 girls is to be selected from the class for its anniversary, in how many ways it can be done?
 (a) 3696 (b) 1848 (c) 924 (d) 1386 (e) None of these
11. Two dices are thrown. What is the probability that the sum of numbers appeared is less than 8?
 (a) $\frac{3}{12}$ (b) $\frac{5}{12}$ (c) $\frac{7}{12}$ (d) $\frac{11}{12}$ (e) None of these
12. The sum of three numbers is 98. If the ratio between the first and second and second and third are respectively 2 : 3 and 5 : 8, then find the second number.
 (a) 48 (b) 28 (c) 30 (d) 36 (e) None of these
13. If 15 men or 24 women or 36 boys can do a piece of work in 12 days, working 8 hours a day, how many men must be associated with 12 women and 6 boys to do another piece of work $2\frac{1}{4}$ times as great in 30 days working 6 hrs a day?
 (a) 24 (b) 18 (c) 10 (d) 8 (e) None of these
14. The ratio between two numbers is 4 : 5. If each number is increased by 9, the ratio becomes 5 : 6. Find the numbers.
 (a) 48, 60 (b) 24, 30 (c) 36, 45 (d) 12, 15 (e) None of these
15. The salary of an employee is first increased by 10% and then decreased by 10%. What was the change in his salary?
 (a) 0% (b) +1% (c) -1% (d) +5% (e) None of these
16. Tax on a commodity is increased by 20% and its consumption is decreased by 15%. Find the effect on revenue.
 (a) +5% (b) -5% (c) +2% (d) -2% (e) None of these
17. A man drives a car to a certain place at a speed of 48 km/h and returns at a speed of 24 km/h. Find the average speed of his whole journey.
 (a) 24 km/h (b) 36 km/h (c) 32 km/h (d) 40 km/h (e) None of these
18. The sum of ages of a son and father is 56 years. After 4 years, the age of father will be three times that of son. What is the age of son?
 (a) 10 years (b) 12 years (c) 16 years (d) 18 years (e) None of these
19. A man purchased an article at 3/4th of the listed price and sold at half more than the listed price. What was his gain percentage?
 (a) 25% (b) 50% (c) 75% (d) 100% (e) None of these

20. Two tables were bought at ₹ 2700. One of them was sold at a loss of 6% and other at a gain of $7\frac{1}{2}\%$. On the whole neither loss nor gain was the result of transaction. What did each table cost?

- (a) 1350, 1350 (b) 1400, 1300 (c) 1500, 1200 (d) 1600, 1100 (e) None of these

21. $\frac{\sqrt[3]{456533} \times \sqrt{256}}{\sqrt{64} \times \sqrt[3]{1331}} = ?$

- (a) 7 (b) 14 (c) 21 (d) 28 (e) None of these

Directions (22–24): In each of the following questions a number series is given in which one number is wrong. You have to find out that number and have to follow the new series which will be started by that number. Then what will be the third number of the new series?

22. 2 9 5 36 125 648 3861

- (a) 12 (b) 11 (c) 75 (d) 72 (e) None of these

23. 3 4 12 45 190 1005 6066

- (a) 98 (b) 96 (c) 384 (d) 386 (e) None of these

24. 2 7 19 43 99 209 431

- (a) 181 (b) 183 (c) 87 (d) 85 (e) None of these

Directions (25–27): In each of the following questions a number series is given. After the series, a number is given followed by (a), (b), (c), (d) and (e). You have to complete the series starting with the number given, following the sequence of the given series.

25. 2 10 27 60

- 5 (a) (b) (c) (d) (e)

Which of the following number will come in place of (b)?

- (a) 39 (b) 13 (c) 34 (d) 38 (e) None of these

26. 15 16 25 50

- 189 (a) (b) (c) (d) (e)

Which of the following numbers will come in place of (e)?

- (a) 354 (b) 273 (c) 394 (d) 426 (e) None of these

27. 5 149 49 113

- 146 (a) (b) (c) (d) (e)

Which of the following number will come in place of (d)?

- (a) 290 (b) 234 (c) 254 (d) 218 (e) None of these

28. If $x + \frac{1}{x} = 3$, then find the value of $x^2 + \frac{1}{x^2}$?

- (a) 3 (b) 5 (c) 7 (d) 9 (e) None of these

29. If $a + b + c = 0$, find the value of $\frac{a^2 + b^2 + c^2}{c^2 - ab}$

- (a) 0 (b) 1 (c) 2 (d) 3 (e) None of these

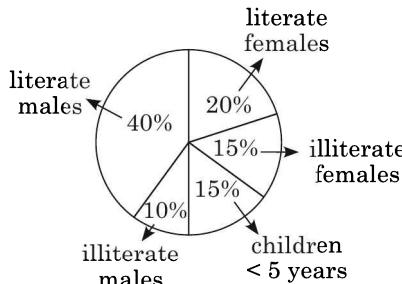
30. Find the value of $\frac{2 + \sqrt{3}}{2 - \sqrt{3}}$
- (a) $4 + 7\sqrt{3}$ (b) $7 - 4\sqrt{3}$ (c) $7 + 4\sqrt{3}$ (d) $4 - 7\sqrt{3}$ (e) None of these
31. A and B enter into a partnership with capitals 4 : 5, and at the end of 8 months, A withdraws. If they receive profits in the ratio 8 : 15, find how long B's capital was used?
- (a) 4 months (b) 8 months (c) 10 months (d) 12 months (e) None of these
32. Out of ₹ 7000, some amount was lent at 6% per annum and the remaining at 4% per annum. If the total simple interest from both the fractions in 5 years was ₹ 1600, find the sum lent at 6% per annum.
- (a) ₹ 5000 (b) ₹ 4000 (c) ₹ 3000 (d) ₹ 2000 (e) None of these
33. Two equal amounts of money are deposited in two banks, each at 15% per annum, for $3\frac{1}{2}$ years and 5 years respectively. If the difference between their interests is ₹ 144, find the sum.
- (a) ₹ 400 (b) ₹ 300 (c) ₹ 640 (d) ₹ 720 (e) None of these
34. A certain sum grows upto ₹ 4840 in 2 years and upto ₹ 5324 in 3 years on compound interest. Find the rate per cent.
- (a) 5% (b) 10% (c) 15% (d) 20% (e) None of these
35. A certain number of men complete a piece of work in 60 days. If there were 8 men more, the work could be finished in 10 days less. How many men were originally there?
- (a) 20 men (b) 30 men (c) 40 men (d) 50 men (e) None of these
36. P, Q and R together do a piece of work for ₹ 535. P working alone can do it in 5 days. Q alone can do it in 6 days and R alone can do it in 7 days. Then what will be the share of R for its work.
- (a) ₹ 100 (b) ₹ 150 (c) ₹ 200 (d) ₹ 250 (e) None of these
37. A cistern has a leak which would empty it in 8 hours. A tap is turned on which admits 6 litres a minute in the cistern, and it is now emptied in 12 hours. How many litres does the cistern hold?
- (a) 8460 L (b) 4320 L (c) 8640 L (d) 4230 L (e) None of these
38. Two trains are moving in the opposite direction on parallel tracks at speeds of 64 km/h and 96 km/h respectively. The first train passes a telegraph post in 5 seconds whereas the second train passes the post in 6 seconds. Find the time taken by the trains to cross each other completely.
- (a) $\frac{28}{11}$ s (b) $\frac{14}{11}$ s (c) $\frac{28}{5}$ s (d) $\frac{14}{5}$ s (e) None of these
39. A train passes two persons who are walking in the direction opposite to which the train is moving, at the rate of 5 m/s and 10 m/s in 6 seconds and 5 seconds respectively. Find the length of the train and speed of the train.
- (a) 140 m, 10 m/s (b) 150 m, 20 m/s (c) 150 m, 30 m/s
 (d) 140 m, 40 m/s (e) None of these

40. A boat travels upstream from B to A and downstream from A to B in 3 hours. If the speed of boat in still water is 9 km/h and speed of the current is 3 km/h, find the distance between A and B in km.
 (a) 6 km (b) 9 km (c) 12 km (d) 18 km (e) None of these
41. A hall, whose length is 16 metres and breadth twice its height takes 168 metres of paper 2 m wide for sticking on its four walls. Find the area of floor.
 (a) 384 m^2 (b) 192 m^2 (c) 576 m^2 (d) 288 m^2 (e) None of these
42. The radius of a sphere is increased by 5%. Find the percentage increase in its surface area.
 (a) 20 (b) 15.5 (c) 10.25 (d) 5.25 (e) None of these
43. A man covers a certain distance by car at a speed of 60 km/h and returns on a scooter at a speed of 40 km/h. Find his average speed for the whole journey.
 (a) 40 km/h (b) 48 km/h (c) 50 km/h (d) 60 km/h (e) None of these
44. The upper part of a tree broken by wind makes an angle of 30° with the ground and the distance from the root of the point where the top of the tree touches the ground is 10 m. What is the height of the tree?
 (a) 30 m (b) 40 m (c) 50 m (d) 60 m (e) None of these

Directions (45–46): The questions below consist of a question followed by two statements labelled I and II. You have to decide whether these statements are sufficient to answer the question. Give answer

- (a) if statement I alone is sufficient to answer the question but statement II alone is not sufficient to answer the question;
 - (b) if statement II alone is sufficient to answer the question but statement I alone is not sufficient to answer the question.
 - (c) if you can get answer from I and II together.
 - (d) if statement I alone or II alone is sufficient.
 - (e) if both statements taken together are not sufficient.
45. What is the value of a two-digit number?
 I. The sum of the two digits is 4.
 II. The difference between the two digits is 2.
46. If x greater than y ?
 I. x is greater than 145.
 II. y is greater than 140.

Directions (47–49): Study the following pie chart and answer the questions given below.



Total population of a town in 2011 = 10 lakhs.

47. What is the total number of literate males in the town?
 (a) 500000 (b) 400000 (c) 200000 (d) 150000 (e) None of these
48. What is the ratio of literate females to literate males?
 (a) 1 : 2 (b) 2 : 3 (c) 1 : 4 (d) 1.5 : 4 (e) None of these
49. What is the total strength of literate people to total population expressed as percentage?
 (a) 40% (b) 30% (c) 50% (d) 60% (e) None of these
50. 6 September 1986 was Saturday. What will be the day on 15 August 2012?
 (a) Monday (b) Tuesday (c) Wednesday (d) Thursday (e) None of these

ANSWERS

1. (c) 2. (d) 3. (d) 4. (b) 5. (c) 6. (c) 7. (b) 8. (d) 9. (b) 10. (b)
 11. (c) 12. (c) 13. (d) 14. (c) 15. (c) 16. (c) 17. (c) 18. (b) 19. (d) 20. (c)
 21. (b) 22. (e) 23. (d) 24. (b) 25. (a) 26. (a) 27. (d) 28. (c) 29. (c) 30. (c)
 31. (d) 32. (d) 33. (c) 34. (b) 35. (c) 36. (b) 37. (c) 38. (c) 39. (b) 40. (c)
 41. (b) 42. (c) 43. (b) 44. (e) 45. (e) 46. (e) 47. (b) 48. (a) 49. (d) 50. (c)

Solutions and Hints

7. Required number of numbers = $5 \times {}^5P_4 = 5 \times 5! = 5 \times 120 = 600$
 8. No. of ways in which Q and R sit together = $2 \times 4! = 48$
 \therefore No. of ways in which Q and R do not sit together = $5! - 48 = 120 - 48 = 72$

9. Required probability = $\frac{{}^4C_1 \times {}^4C_1}{{}^{52}C_2} = \frac{4 \times 4 \times 2}{52 \times 51} = \frac{8}{13 \times 51} = \frac{8}{663}$

10. Required number of ways = ${}^8C_2 \times {}^{12}C_2 = \frac{8 \times 7}{1 \times 2} \times \frac{12 \times 11}{1 \times 2} = 28 \times 66 = 1848$

11. Desired sum of number are 2, 3, 4, 5, 6 and 7.

$$n(s) = 1 + 2 + 3 + 4 + 5 + 6 = 21$$

$$\therefore \text{Required Probability} = \frac{21}{36} = \frac{7}{12}$$

12. $x : y = 2 : 3$ and $y : z = 5 : 8$

$$x : y : z = 10 : 15 : 24$$

$$\begin{array}{rcc} x & y & z \\ 2 & 3 & \\ \hline 5 & 8 \\ \hline 10 & 15 & 24 \end{array}$$

$$\therefore \text{Second number } y = \frac{15}{10+15+24} \times 98 = \frac{15}{49} \times 98 = 30$$

13. $30 \text{ days} : 12 \text{ days} \left. \begin{array}{l} 6 \text{ h} : 8 \text{ h} \\ 1 \text{ work} : 2\frac{1}{4} \text{ work} \end{array} \right\} :: 15 \text{ men} : \text{required no. of men}$

$$\therefore \text{Required no. of men} = \frac{15 \times 12 \times 8 \times 2.25}{30 \times 6 \times 1} = 18$$

$$24 \text{ women} = 15 \text{ men}$$

$$\therefore 12 \text{ women} = 7.5 \text{ men}$$

$$36 \text{ boys} = 15 \text{ men}$$

$$\therefore 6 \text{ boys} = \frac{15}{6} = 2.5 \text{ men}$$

$$\therefore 12 \text{ women} + 6 \text{ boys} = 7.5 + 2.5 = 10 \text{ men}$$

$\therefore 18 - 10 = 8$ men must be associated.

14. Ratio of numbers = 4 : 5

$$\text{i.e. } 4k : 5k$$

$$\text{After increasing, ratio} = (4k + 9) : (5k + 9) = 5 : 6$$

$$\Rightarrow k = 9$$

\therefore The numbers are **36 and 45**

$$15. \text{ Net change} = \frac{-x^2}{100}\% = \frac{-10^2}{100} = -1\%$$

$$16. \text{ Net revenue} = 20\% - 15\% - \frac{20 \times 15\%}{100} = (20 - 15 - 3)\% = 2\%$$

i.e. increase of 2%.

$$17. \text{ Average speed} = \frac{2 \times 48 \times 24}{48 + 24} = \frac{2 \times 48 \times 24}{72} = 2 \times 16 = \mathbf{32 \text{ km/h}}$$

$$18. x + (56 - x) = 56$$

$$\frac{(x + 4)}{(60 - x)} = 1/3 \text{ or } 60 - x = 3x + 12$$

$$\Rightarrow x = \mathbf{12 \text{ years.}}$$

19. Let the listed price of article be ₹ 100.

$$\therefore \text{Cost price} = \frac{3}{4} \times 100 = \text{₹ 75}$$

$$\text{Selling price} = \frac{3}{2} \times 100 = \text{₹ 150}$$

$$\therefore \text{Profit} = \frac{\text{SP} - \text{CP}}{\text{CP}} \times 100 = \frac{150 - 75}{75} \times 100 = \mathbf{100\%}$$

20. Let the cost of first table be ₹ x .

$$\therefore x \times \left(\frac{94}{100} \right) + (2700 - x) \frac{107.5}{100} = 2700$$

$$x \left(\frac{107.5 - 94}{100} \right) = 2700 \left(\frac{107.5 - 100}{100} \right)$$

$$\therefore x = \frac{2700 \times 7.5}{107.5 - 94} = \frac{2700 \times 7.5}{13.5} = \mathbf{₹ 1500}$$

\therefore Prices of tables are ₹ 1500 and ₹ 1200

21. $\frac{77 \times 16}{8 \times 11} = 14$

22. The series is $\times 1 + 7, \times 2 - 11, \times 3 + 15, \dots$

Here the wrong number in the series is 5. Therefore, the series starting with 5 is

$$5, (5 \times 1 + 7), (5 \times 1 + 7) \times 2 - 11$$

i.e., 5, 12, 3.

\therefore The third term of series is 3.

Hence the answer here is (e).

23. The series is $\times 1 + 1^2, \times 2 + 2^2, \times 3 + 3^2, \dots$

Here the wrong number in the series is 190. Therefore, series starting with 190 is

$$190, (190 \times 1 + 1^2), (190 \times 1 + 1^2) \times 2 + 2^2$$

i.e., 190, 191, 386.

\therefore The third term of series is 386.

Hence the answer is (d).

24. The series is $\times 2 + 3, \times 2 + 5, \times 2 + 7, \times 2 + 9, \dots$

Here the wrong number in the series is 43. Therefore, series starting with 43 is

$$43, (43 \times 2 + 3), (43 \times 2 + 3) \times 2 + 5$$

i.e., 43, 89, 183.

\therefore The third term of series is 183.

Hence the answer is (b).

25. The series is $\times 2 + 6, \times 2 + 7, \times 2 + 6, \dots$

Here the required term in place of (b)

$$= (5 \times 2 + 6) \times 2 + 7 = 39$$

Hence the answer is (a).

26. The series is $+ 1^2, + 3^2, + 5^2, + 7^2, \dots$

Here the required term in place of (e)

$$= 189 + 1^2 + 3^2 + 5^2 + 7^2 + 9^2 = 354$$

Hence the answer is (a).

27. The series is $+ 12^2, - 10^2, + 8^2, - 6^2, \dots$

Here the required number in place of (d)

$$= 146 + 12^2 - 10^2 + 8^2 - 6^2 = 146 + 44 + 28 = 218.$$

Hence the answer is (d).

28. $x^2 + \frac{1}{x^2} = \left(x + \frac{1}{x}\right)^2 - 2 = 3^2 - 2 = 7$

29. $a + b + c = 0 \Rightarrow (a + b + c)^2 = 0 \Rightarrow a^2 + b^2 + c^2 + 2(ab + bc + ca) = 0$

$$\begin{aligned} \Rightarrow a^2 + b^2 + c^2 &= -2(ab + bc + ca) = -2[ab + c(a + b)] \\ &= -2[ab + c(-c)] = 2[c^2 - ab] \end{aligned}$$

$$\therefore \frac{a^2 + b^2 + c^2}{c^2 - ab} = 2$$

30. $\frac{2 + \sqrt{3}}{2 - \sqrt{3}} = \frac{(2 + \sqrt{3})^2}{(2 - \sqrt{3})(2 + \sqrt{3})} = \frac{4 + 3 + 4\sqrt{3}}{4 - 3} = 7 + 4\sqrt{3}$

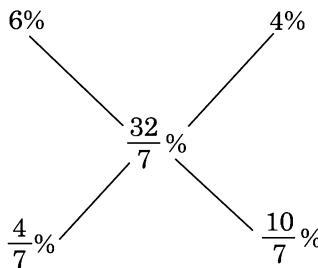
31. Ratio of capitals = 4 : 5; ratio of time = 8 : x

$$\Rightarrow 4 \times 8 : 5 \times x = 8 : 15$$

$$\Rightarrow \frac{32}{5x} = \frac{8}{15}$$

$$\Rightarrow x = \frac{32 \times 15}{5 \times 8} = 4 \times 3 = \mathbf{12 \text{ months}}$$

32. Overall rate of interest = $\frac{1600 \times 100}{5 \times 7000} = \frac{32}{7}\%$



Ratio of two amounts = 2 : 5

$$\therefore \text{Amount lent at } 6\% = 7000 \times \frac{2}{7} = \mathbf{\text{₹ 2000}}$$

33. Sum = $\frac{\text{Difference in interests}}{\text{Rate} \times \text{Difference in period}} \times 100$
 $= \frac{144 \times 100}{15 \times 1.5} = \mathbf{\text{₹ 640}}$

34. Rate = $\frac{\text{Difference in amounts of } n\text{th and } (n+1)\text{ years}}{\text{Amount after } n \text{ years}} \times 100$
 $= \frac{5324 - 4840}{4840} \times 100 = \mathbf{10\%}$

35. $60 \times x = 50(x + 8)$

$$\Rightarrow x = \frac{50 \times 8}{60 - 50} = \frac{400}{10} = \mathbf{40 \text{ men}}$$

36. P's share : Q's share : R's share

$$= 6 \times 7 : 5 \times 7 : 5 \times 6$$

$$= 42 : 35 : 30$$

$$\therefore \text{R's share} = \frac{30}{42 + 35 + 30} \times 535 \\ = \frac{30}{107} \times 535 = \text{₹ 150}$$

37. The filler tap can fill the tank in $\frac{12 \times 8}{12 - 8} = 24$ hours

$$\therefore \text{Capacity of tank} = 6 \times 60 \times 24 = 8640 \text{ litres}$$

38. Ratio of speeds = 64 : 96 = 2 : 3

Time to cross telegraph posts = 5 seconds and 6 seconds

$$\text{Required time to cross each other} = \frac{ax + by}{x + y} = \frac{2 \times 5 + 3 \times 6}{2 + 3} = \frac{28}{5} \text{ s}$$

39. Length of train = Difference in speed $\times \frac{\text{time 1} \times \text{time 2}}{\text{time 1} - \text{time 2}}$

$$= \frac{(10 - 5) \times 6 \times 5}{6 - 5} = 150 \text{ m}$$

Speed of train be x m/s

$$(x + 5) \times 6 = (x + 10)5$$

$$\Rightarrow 6x + 30 = 5x + 50$$

$$\Rightarrow x = 50 - 30 = 20 \text{ m/s}$$

40. $u = 9 \text{ km/h}$; $v = 3 \text{ km/h}$

Let $AB = x \text{ km}$

$$x = (u + v)t_1 = (u - v)t_2$$

$$t_1 + t_2 = 3 \text{ hours}$$

$$\therefore (9 + 3)t_1 = (9 - 3)(3 - t_1)$$

$$\Rightarrow 12t_1 = 18 - 6t_1$$

$$\Rightarrow t_1 = \frac{18}{12 + 6} = 1 \text{ hour}$$

$$\therefore x = (u + v)t_1 = (9 + 3) \times 1 = 12 \text{ km}$$

$$= \text{Total time} \times \frac{(\text{Speed in still water})^2 - (\text{Speed of current})^2}{2 \times \text{Speed in still water}}$$

$$= 3 \times \frac{9^2 - 3^2}{2 \times 9} = \frac{3 \times 72}{18} = 12 \text{ km}$$

41. Let height be h metres

$$\therefore b = 2h$$

$$\therefore 2(16 + 2h)h = 168 \times 2$$

$$\Rightarrow (16 + 2h)h = 168$$

$$\Rightarrow h^2 + 8h - 84 = 0$$

$$(h + 14)(h - 6) = 0$$

$$\therefore h = 6 \text{ m}$$

$$\therefore \text{Floor area} = 16 \times 2h = 16 \times 12 = 192 \text{ m}^2$$

42. Required percentage value = $2x + \frac{x^2}{100}$

$$= 2 \times 5 + \frac{5^2}{100} = 10 + 0.25 = 10.25$$

43. Average speed = $\frac{2 \times 60 \times 40}{60 + 40} = 48 \text{ km/h}$

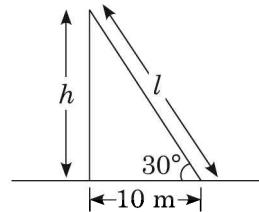
44. $\tan 30^\circ = \frac{h}{10} = \frac{1}{\sqrt{3}}$

or $h = \frac{10}{\sqrt{3}}$

$$l \sin 30 = h = \frac{10}{\sqrt{3}} = \frac{l}{2}$$

or $l = \frac{20}{\sqrt{3}}$

$$\therefore \text{Total height of tree} = l + h = \frac{20}{\sqrt{3}} + \frac{10}{\sqrt{3}} = \frac{30}{\sqrt{3}} = 10\sqrt{3} \text{ m} = 17.32 \text{ m}$$



45. Even both statements taken together will not give the correct answer.

46. x can take values from 146 and y can take values from 141. y can also take values more than 146 such as 147, 148, ... So you can't clearly state that x is greater than y .
 \therefore The answer is (e).

47. 40% of 1000000 = 400000

48. $\frac{20\% \text{ of } 10 \text{ lakh}}{40\% \text{ of } 10 \text{ lakh}} = \frac{1}{2}$

\therefore Required ratio is 1 : 2

49. Total strength of literates = 40 + 20 = 60%

50. 6 September 1986 – Saturday.

6 September 1986 – 6 September 2011

$$= 25 \text{ years} = 6 \times 4 + 1 \text{ years}$$

$$= 6 \times 5 + 1 \text{ odd days} = 31 \text{ odd days}$$

$$31 \% 7 = 3 \text{ odd days.}$$

6 September 2011 – 15 August 2012

$$= 24 + 31 + 30 + 31 + 31 + 29 + 31 + 30 + 31 + 30 + 31 + 15$$

$$= 344 \text{ days}$$

$$344 \% 7 = 1 \text{ odd days}$$

\therefore Total odd days = 3 + 1 = 4 odd day

\therefore 15th August 2012 is Saturday + 4 = Wednesday

Model Test Paper 2

Each question (1–3) given below consists of a statement followed by two arguments numbered I and II. You have to decide which of the arguments is a ‘strong’ argument and which is a ‘weak’ argument.

Give answer (a) if only argument I is strong; (b) if only argument II is strong; (c) if either I or II is strong; (d) if neither I nor II is strong and (e) if both I and II are strong.

1. Statement : Should state lotteries be stopped?

Arguments : I. Yes. Government should not promote gambling habits.
II. No. Government will lose a large amount of revenue.

2. Statement : Should the illiterate be debarred from voting?

Arguments : I. Yes. They are easily misguided.
II. No. It is their constitutional right.

3. Statement : Is monarchy better than democracy?

Arguments : I. Yes. If the chair has one confirmed ruler, there are no ambitious aspirants fighting for it.
II. No. People are more contended and happy in democracy.

In each question (4 – 6) below is given a statement followed by two assumptions numbered I and II. Consider the statement and decide which of the given assumptions is implicit.

Give answer (a) if only assumption I is implicit; (b) if only assumption II is implicit; (c) if either I or II is implicit; (d) if neither I nor II is implicit and (e) if both I and II are implicit.

4. Statement : Please consult me before making any decision on exports from the company.

Assumptions : I. You may take a wrong decision if you don’t consult me.
II. It is important to take a right decision.

5. Statement : “If you are beautiful, we will catch your beauty. If you are not, we will make you beautiful”—An advertisement of a photo studio.

- Assumptions : I. How to look beautiful, is a problem of youngster.
II. Nobody desires to be beautiful.
6. Statement : A warning in a train compartment—"To stop train, pull chain. Penalty for use without sufficient cause attracts 6 months imprisonment and/or fine up to ₹ 1000".
- Assumptions : I. Some people misuse the alarm chain.
II. On certain occasions, people may want to stop a running train.

In each question (7–9) below is given a statement followed by two courses of action numbered I and II. A course of action is a step or administrative decision to be taken for improvement, follow-up or further action in regard to the problem policy, etc. on the basis of the information given in the statement. You have to assume everything in the statement to be true, then decide which of the two given suggested courses of actions logically follows for pursuing.

Give answer (a) if only I follows; (b) if only II follows; (c) if either I or II follows; (d) if neither I nor II follows and (e) if both I and II follow:

7. Statement : A shopkeeper was reported to be selling adulterated grains.
- Courses of Action : I. He should be fined and his shop sealed.
II. He should be asked to leave the town and open a shop elsewhere.
8. Statement : A train has derailed near a station while moving over a bridge and fell into the river.
- Courses of Action : I. The railway authorities should clarify the reason of the accident to the government.
II. The government should allocate funds to compensate the destruction caused.
9. Statement : The Courts take too long in deciding important disputes of various departments.
- Courses of Action : I. The Courts should be ordered to speed up matters.
II. Special powers should be granted to officers to settle disputes concerning their department.

In each of the following questions (10–12) a statement is given followed by two conclusions I and II. Give answer (a) if only conclusion I follows; (b) if only conclusion II follows; (c) if either I or II follows; (d) if neither I nor II follows and (e) if both I and II follow.

10. Statement : Domestic demand has been increasing faster than the production of indigenous crude oil.
- Conclusions : I. Crude oil must be imported.
II. Domestic demand should be reduced.
11. Statement : Patients with minor ailments usually do not go to eminent doctors.
- Conclusions : I. Eminent doctors remain too busy with patients suffering from serious complications.
II. Their charges are rather high.
12. Statement : Parents are prepared to pay any price for an elite education to their children.

Conclusions : I. All parents these days are very well off.

II. Parents have an obsessive passion for a perfect development of their children through good schooling.

In each of the following questions (13–19) there is a certain relation between two given words on one side of :: and one word is given on the another side of :: while another word is to be found from the given alternatives, having the same relation with this word as the words of the given pair bear. Choose the correct alternative.

13. Melt : Liquid :: Freeze : ?
(a) Ice (b) Condense (c) Solid (d) Crystal

14. Acting : Theatre :: Gambling : ?
(a) Casino (b) Club (c) Bar (d) Gym

15. Dungeon : Confinement :: Asylum : ?
(a) Refuge (b) Mercy (c) Truancy (d) Remorse

16. Ruby : Red :: Sapphire: ?
(a) Blue (b) White (c) Green (d) Silver

17. Scrap : Food :: Lees : ?
(a) Bread (b) Tea (c) Wine (d) Rice

18. Wimbledon Trophy : Tennis :: Walker's Cup : ?
(a) Hockey (b) Polo (c) Golf (d) Wrestling

19. Meat : Vegetarian :: Liquor : ?

In each of the following questions (20–22) a group of three inter-related words is given. Choose a word from the given alternatives that belongs to the same group.

20. Peas : Gram : Pulses
(a) Rice (b) Barley (c) Beans (d) Coconut

21. Potato : Carrot : Radish
(a) Tomato (b) Spinach (c) Sesame (d) Groundnut

22. Marble : Slate : Gneiss
(a) Quartzite (b) Limestone (c) Coal (d) Sandstone

Directions (23–27): Choose the word which is least like the other words in the group.

- 23.** (a) Whale (b) Dolphin (c) Shark (d) Cod (e) Starfish
24. (a) Indigo (b) Orange (c) Yellow (d) Pink (e) Green
25. (a) Pituitary (b) Pancreas (c) Thalamus (d) Adrenal (e) Testis
26. (a) Nerves (b) Auricle (c) Artery (d) Valve (e) Aorta
27. (a) Metre (b) Furlong (c) Yard (d) Mile (e) Acre

28. A number series is given with one term missing. Choose the correct alternative that will continue the same pattern and fill in the blank spaces.

3, 7, 25, _____ 721.

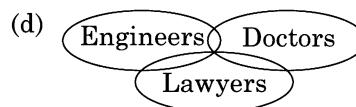
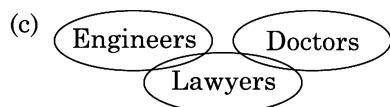
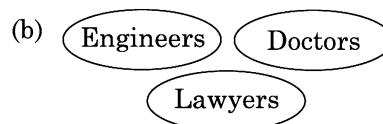
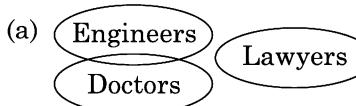
- (a) 144 (b) 166 (c) 121 (d) 112 (e) None of these

29. Find the wrong term in the series

$$2, 6, 12, 24, 30, 42$$

(a) 6 (b) 12 (c) 24 (d) 30 (e) 42

30. If BATCH is coded as ABCTH, how is SEVEN coded in that code?
 (a) FTUGP (b) RFUFN (c) ESEVN (d) TFGUP (e) None of these
31. If in a certain language 'TABLE' is coded as 'FMCBU' then which word is coded as 'TOWER' in the same language?
 (a) SFXPU (b) QDVNS (c) UPXFS (d) SNVDQ (e) None of these
32. If 'book' is called 'pencil', 'pencil' is called 'pen', 'pen' is called 'rubber' and 'rubber' is called 'sky'. Then what is used to draw figure?
 (a) pencil (b) pen (c) book (d) rubber (e) None of these
33. In a certain language, '45' means 'Good morning', '357' means 'Buy good items'. '268' means 'Man is handsome'. What stands for 'morning' in that code?
 (a) 3 (b) 4 (c) 5 (d) 6 (e) 8
34. Pointing to a photograph, a woman said—"He is the only son of my mother's father." Then the relation of the person in the photograph to the woman is
 (a) Aunt (b) Uncle (c) Father (d) Son (e) None of these
35. A person started walking from a point P for a distance of 3 m towards east. Then he turned left and walked 10 m. Then he turned right and walked 2 m. Then he turned left and walked 2 m and reach the point Q. What is the present position of the person with reference to its starting point?
 (a) 17 m NE (b) 7 m NE (c) 13 m NE (d) 13 m SW (e) None of these
36. A group of persons consisting of engineers, doctors and lawyers are represented suitably using one of the following Venn diagram. The best representation of it is



(e) None of these

37. Dinesh is ranked 4th from top among boys and 19th from top among all students. If the total number of girls in the class is 22, then find the number of girls behind Dinesh in ranking.

(a) 3 (b) 7 (c) 18 (d) 15 (e) None of these

(38–42) Six persons A, B, C, D, E and F are seated around a round table.

- (i) C is seated to the left of E and opposite to B.
- (ii) A is seated opposite to D and left of B.
- (iii) F is between B and D.

38. Who is seated in between A and F?

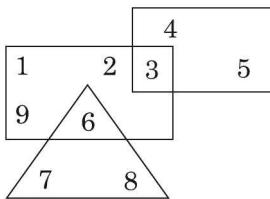
(a) C (b) D (c) E (d) B

39. Who is seated to the right of C?

(a) A (b) B (c) E (d) F

40. Who is seated opposite to E?
 (a) A (b) B (c) D (d) F
41. Who is seated to the right of E?
 (a) A (b) B (c) C (d) D
42. Who is seated between D and E?
 (a) A (b) B (c) C (d) F
43. How many numbers are there between 1 and 100 which is having at least one digit as 4 and the number divisible by 4?
 (a) 3 (b) 5 (c) 7 (d) 9 (e) None of these
44. How many days will there be from 15 August 1988 to 5 June 1989 both days included?
 (a) 272 (b) 293 (c) 294 (d) 295 (e) None of these
45. How many 2 are there in the following number sequence which are immediately preceded by 5 but not followed by 9?
 1 3 5 2 8 6 4 2 7 3 9 5 2 3 8 5 2 8
 (a) 1 (b) 2 (c) 3 (d) 4 (e) None of these

(46–48) In the following figure, rectangle, square and triangle represent male, civil servants and professionals in a society. On the basis of this figure answer the following questions.



46. Who among the following is a male and a professional?
 (a) 7 (b) 8 (c) 6 (d) 5 (e) 4
47. Who among the following is a female civil servant?
 (a) 3 (b) 4 (c) 2 (d) 1 (e) 9
48. Who among the following is neither a civil servant nor a professional?
 (a) 6 (b) 5 (c) 4 (d) 2 (e) 7

Directions (49–53): Study the following information carefully and answer the questions given below it. The following are the criteria to get employment in a pharmaceutical company. The applicant must

- (i) have passed graduation with science subject with at least 50% marks.
- (ii) have completed 21 years (in case of males) and 19 years (in case of females) of age as on 1 August 2010.
- (iii) Pay deposit as follows:

| Marks at graduation | If son/daughter of trustee or staff | If not son/daughter of trustee or staff |
|---------------------|-------------------------------------|---|
| 75% and above | ₹ 5000 | ₹ 10000 |
| 61% to 74% | ₹ 10000 | ₹ 20000 |
| 60% and below | ₹ 20000 | ₹ 40000 |

However,

- (iv) If the candidate has secured more than 90% marks at graduation, he should be referred to the Managing Director for consideration for further concession in deposit.
- (v) In the case of SC/ST candidates, deposit payable is 20% less in each of the above cases.
- (vi) If the candidate remits in cash the amount of deposit immediately on the date of first call, the candidate can be selected, provided he fulfils conditions (i) and (ii).
- (vii) If, on the date of first call, the amount of deposit brought by a candidate eligible as per (i) and (ii) is less than the total amount required but more than 3/4th the candidate can be provisionally selected, provided he deposits the balance amount within next ten days.
- (viii) If on the date of first call, the amount of deposit brought is less than 3/4th but more than 1/2, the candidate eligible as per (i) and (ii) can be sent to the Managing Director.
- (ix) If on the date of first call, the amount of deposit brought is less than 1/2, the candidate though eligible as per (i) and (ii), cannot be selected.

On the basis of the above criteria, decide which of the following courses is described in each question.

Mark answer (a) if the candidate can be selected; (b) if the candidate can be provisionally selected; (c) if the candidate should be referred to the Managing Director; (d) if the candidate cannot be selected; (e) if the data provided is inadequate.

49. Satheesh, son of a trustee of the organisation, obtained 68% marks in B.Sc. He brings a deposit of ₹ 8200 on the day of the first call, but intends to pay the balance amount within ten days. He is a general candidate and his date of birth is 2nd November 1988.
50. Sujatha is an SC candidate. Her date of birth is 26 January 1990. She passed her graduation in Science with 67% marks. She can deposit ₹ 18000.
51. Mahesh, a 22 year old general category candidate, secured 92% marks in graduation with Science. He can pay only ₹ 3000 as deposit. He is not a son of a staff or trustee of the organisation.
52. Ramesh, born on 21 August, 1985 is a son of an employee working in the organisation secured 66% marks in M.Sc. and is in a position to deposit only ₹ 2000. He is an SC category candidate.
53. Suresh Varma, a general category candidate, is a graduate in Science with 57% marks. His date of birth is 13 December 1987.

Directions (54–58): In the following questions, two statements are given namely Assertion (A) and Reason (R). Choose the correct alternative from the following:

- (a) Both A and R are true and R is the correct explanation of A.
 - (b) Both A and R are true but R is not the correct explanation of A.
 - (c) A is true but R is false.
 - (d) A is false but R is true.
 - (e) Both are false.
54. Assertion (A) : An atom is neutral despite the charged particles in it.
Reason (R) : Neutrons do not have any charge.

55. Assertion (A) : Glass tumbler breaks in winter when hot water is poured in it.

Reason (R) : When hot water is poured, the outer surface of glass expands.

56. Assertion (A) : Silver is not used to make electric wires.

Reason (R) : Silver is a bad conductor.

57. Assertion (A) : Carbon forms the largest number of compounds.

Reason (R) : Carbon has the catenation property.

58. Assertion (A) : Cut fruits and vegetables should not be kept open for long time.

Reason (R) : Their vitamin content is ruined.

Directions (59–60): To each of the following questions four probable answers have been given. Select the most appropriate alternative as the answer.

59. While firing crackers, a child gets severe burns on the hand. What would you do?

- (a) Dip the child's hand in cold water till there is no more burning sensation.
- (b) Wash the hands with dettol.
- (c) Send some one to call the doctor.
- (d) Apply some ointment on the affected area.

60. You are moving across the road on a scooter when you observe that two boys on a bike snatch a lady's gold chain and ride away. You would

- (a) Console the woman.
- (b) Chose the boys to catch hold of them.
- (c) Inform the police about the matter.
- (d) Stand and see what happens next.

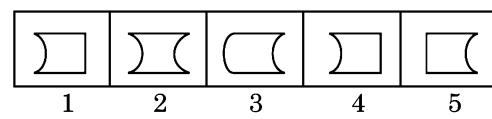
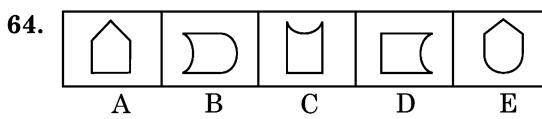
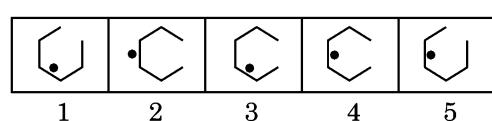
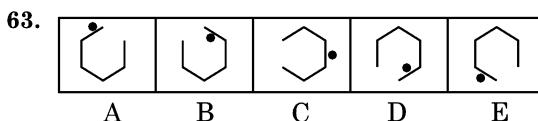
61. If '+' means '×', '-' means '÷' and '×' means '−', then the value of $6 + 3 \times 5 - 1$ is

- (a) 44
- (b) 13
- (c) 20
- (d) 24
- (e) None of these

62. If '×' means '−', '−' means '+', '+' means '÷' and '÷' means '×', then the value of $\frac{12 \times 2 - 7 \div 5}{8 - 2 \times 5}$ is

- (a) 1
- (b) 3
- (c) 5
- (d) 7
- (e) 9

Directions (63–66): Each of the following questions consists of five figures marked A, B, C, D and E called problem figures followed by five other figures marked 1, 2, 3, 4 and 5 called answer figures. Select a figure from amongst the answer figures which will continue the same series as established by the five problem figures.



| | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| x | c | s | c | x | $=$ | s | c | s | $=$ | o | s |
| $=$ | c | s | s | o | $=$ | o | x | x | c | c | $=$ |
| $=$ | s | s | o | o | | c | c | c | c | c | |

- A B C D E

| | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| x | s | $=$ | c | s | o | c | $=$ | o | x | o | x |
| $=$ | s | c | $=$ | x | x | c | $=$ | s | c | s | $=$ |
| $=$ | o | c | $=$ | s | x | x | c | $=$ | s | o | s |

- 1 2 3 4 5

| | | | | |
|---|---|---|---|---|
| | | | | |
| A | B | C | D | E |

| | | | | |
|---|---|---|---|---|
| | | | | |
| 1 | 2 | 3 | 4 | 5 |

Directions (67–70): Each of the following questions consists of two sets of figures. Figures A, B, C and D constitute problem figures while figures 1, 2, 3, 4 and 5 constitute answer figures. There is a definite relationship between figures A and B. Establish a similar relationship between figures C and D by choosing a suitable figure (D) from answer figures.

| | | | |
|---|---|---|---|
| | | | |
| A | B | C | D |

| | | | | |
|---|---|---|---|---|
| | | | | |
| 1 | 2 | 3 | 4 | 5 |

| | | | |
|---|---|---|---|
| | | | |
| A | B | C | D |

| | | | | |
|---|---|---|---|---|
| | | | | |
| 1 | 2 | 3 | 4 | 5 |

| | | | |
|---|---|---|---|
| | | | |
| A | B | C | D |

| | | | | |
|---|---|---|---|---|
| | | | | |
| 1 | 2 | 3 | 4 | 5 |

| | | | |
|---|---|---|---|
| | | | |
| A | B | C | D |

| | | | | |
|---|---|---|---|---|
| | | | | |
| 1 | 2 | 3 | 4 | 5 |

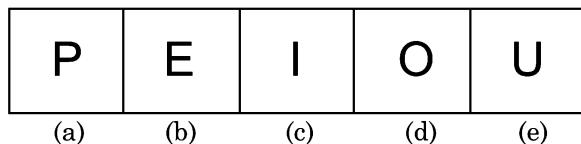
Directions (71–80): Out of the five figures (a), (b), (c), (d) and (e), given in each problem, four are similar in a certain way. However, one figure is not like the other four. Choose the figure which is different from the rest.

| | | | | |
|-----|-----|-----|-----|-----|
| | | | | |
| (a) | (b) | (c) | (d) | (e) |

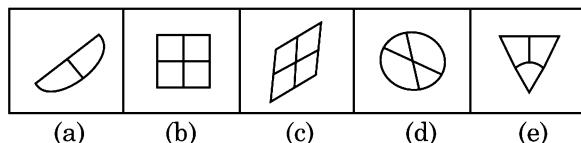
| | | | | |
|-----|-----|-----|-----|-----|
| | | | | |
| (a) | (b) | (c) | (d) | (e) |

| | | | | |
|-----|-----|-----|-----|-----|
| | | | | |
| (a) | (b) | (c) | (d) | (e) |

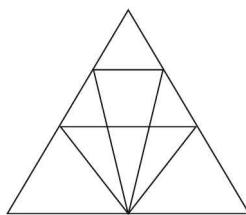
74.



75.



76. Count the number of triangles in the following figure.



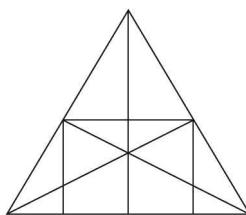
(a) 12

(b) 18

(c) 22

(d) 26

77. How many straight lines are there in the given figure?



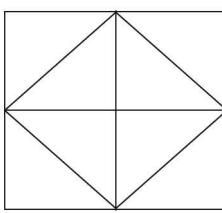
(a) 10

(b) 9

(c) 8

(d) 6

78. Count the number of pentagons in the following figure.



(a) 16

(b) 14

(c) 12

(d) 10

79. A cube in painted blue on all faces is cut into 125 cubes of equal size. How many cubes are there which are painted on one face only?

(a) 8

(b) 16

(c) 36

(d) 54

(e) None of these

80. A cube is painted on all faces is cut into 64 cubes of equal size. How many cubes are there which are painted on at least one face?

(a) 40

(b) 48

(c) 56

(d) 64

(e) None of these

ANSWERS

- | | | | | | | | | | |
|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
| 1. (d) | 2. (b) | 3. (d) | 4. (e) | 5. (d) | 6. (e) | 7. (a) | 8. (d) | 9. (e) | 10. (c) |
| 11. (c) | 12. (b) | 13. (c) | 14. (a) | 15. (a) | 16. (a) | 17. (c) | 18. (c) | 19. (c) | 20. (c) |
| 21. (d) | 22. (a) | 23. (a) | 24. (d) | 25. (c) | 26. (a) | 27. (e) | 28. (c) | 29. (c) | 30. (c) |
| 31. (b) | 32. (b) | 33. (b) | 34. (b) | 35. (c) | 36. (b) | 37. (b) | 38. (d) | 39. (c) | 40. (d) |
| 41. (a) | 42. (c) | 43. (c) | 44. (d) | 45. (c) | 46. (c) | 47. (b) | 48. (d) | 49. (b) | 50. (a) |
| 51. (c) | 52. (d) | 53. (e) | 54. (b) | 55. (c) | 56. (c) | 57. (d) | 58. (a) | 59. (a) | 60. (b) |
| 61. (b) | 62. (e) | 63. (4) | 64. (4) | 65. (4) | 66. (5) | 67. (4) | 68. (4) | 69. (4) | 70. (1) |
| 71. (e) | 72. (d) | 73. (d) | 74. (a) | 75. (d) | 76. (b) | 77. (b) | 78. (c) | 79. (d) | 80. (c) |

Solutions and Hints

- Clearly, none of the reasons is strong enough in favour of or against the statement. So none of these holds.
- Argument I is not strong enough because no one can be debarred from their constitutional rights even if they cannot practise it to their benefit. But argument II is strong.
- The success of a government depends on its outlook and policies. So argument I is not strong enough. Argument II is also vague because a democracy is coveted for the reason that in it, the voice of the people is above all.
- The statement was spoken for fear that the other person may not take a wrong decision. So, assumption I is implicit. The statement confirms that it was important to take the right decision. So assumption II is also implicit.
- Nothing is mentioned in the advertisement about the problem of youngsters. So assumption I is not implicit. The advertisement is meant for persons who desire to look beautiful. So assumption II is also not implicit.
- Penalty is imposed to prevent people from misusing the alarm chain. So assumption I is implicit. The alarm chain is provided to stop the running train in times of urgency. So assumption II is also implicit.
- If he is allowed to continue without being punished, he would create the problem elsewhere. So only I follows.
- Preventive measures to protect the passengers and pay them adequate compensation are necessary in this case. So none of the courses follows.
- For quick disposal of cases, either the methods in the court should be speeded up or the matters should be cleared up in their respective departments to prevent the delay. So, both the courses follow.
- As given in the statement, domestic demand is increasing and for having a balance between production of crude oil and consumption of oil and oil by-products either of the two conclusions should follow.
- As given in the statement, patients with minor ailments do not go to eminent doctors. This may be either of the two reasons stated in conclusions I and II. Therefore, either I or II follows.

12. Most parents wish to give the best education to their children as they can. This can be done only through good schooling. Therefore, only conclusion II follows. But conclusion I does not follow.
13. The first is the process of formation of the second.
14. The second is the place for performing the first.
15. A prisoner is confined within the dungeon, and an unsheltered person takes refuge within the asylum.
16. Ruby is a red precious stone and sapphire is a blue precious stone.
17. The first is the left over the second.
18. The Wimbledon Trophy is associated with Tennis while the Walker's Cup is associated with Golf.
19. A vegetarian never eats meat. Similarly, a teetotaller never drinks liquor.
23. All except whale belong to the family of fishes.
24. All except pink are colours seen in a rainbow.
25. All except Thalamus are hormone secreting glands.
26. All except nerves are parts of the heart.
27. All except acre are units for measuring distance, while acre is a unit of area.
28. The series is obtained by multiplying with 3 and subtracting 2, multiplying with 4 and subtracting 3 and so on. So $25 \times 5 - 4 = 121$ is the missing term.
29. The series obtained is $1^2 + 1, 2^2 + 2, 3^2 + 3, \dots$

Next term = $4^2 + 4 = 20$

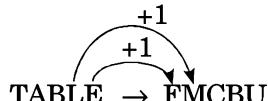
Here it is 24

$\therefore 24$ is wrong.

30. BATCH → ABCTH

Every pair of letters is reversed in the code. Therefore 'SEVEN' is coded as 'ESEVN'

- 31.



Word is reversed and 1 is added to every character.

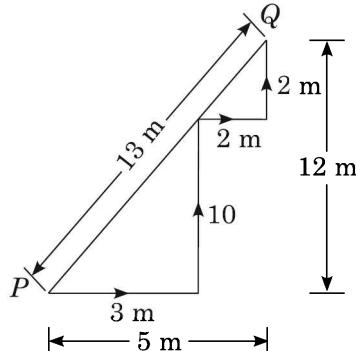
Similarly ? → 'TOWER'

The required word is obtained by reversing the code 'TOWER' and subtracting 1 from each character.

\therefore The answer is 'QDVNS'

32. From the given items, pencil is the one which can be used for drawing a figure. But, here 'pencil' is called 'pen'. Therefore 'pen' is the answer.
33. Here '45' means 'good morning', '357' means 'Buy good items'. Above two codes consists of '5' as a code for the common word 'good'.
- \therefore In '45', '5' stands for 'good' and '4' stands for 'morning'
- \therefore The answer is (b).
34. Only son of my mother's father means brother of my mother.
- \therefore The person is brother of woman's mother, i.e. **uncle**.

35. $PQ = \sqrt{(3+2)^2 + (10+2)^2}$
 $= \sqrt{5^2 + 12^2} = \sqrt{169} = 13 \text{ m}$
 $\therefore Q \text{ is } 13 \text{ m NE of } P.$



36. The 3 groups of persons are of 3 different profession and is not having any common property. Therefore, it can be represented by the choice (b).

37. Number of girls in front of Dinesh = $19 - 4 = 15$

Total number of girls = 22

\therefore Number of girls behind Dinesh = $22 - 15 = 7$

38. B is seated between A and F.

39. E is seated to the right of C.

40. F is seated opposite to E.

41. A is seated to the right of E.

42. C is seated between D and E.

43. There are seven such numbers which are having at least one digit as 4 and number fully divisible by 4. They are 4, 24, 40, 44, 48, 64 and 84.

44. Number of days = $17 + 30 + 31 + 30 + 31 + 31 + 28 + 31 + 30 + 31 + 5 = 295 \text{ days}$

45. 1 3 5 2 8 6 4 2 7 3 9 5 2 3 8 5 2 8

Number '2', which is underlined is given as per the condition given in the question.
The total number of such 2s is 3.

46. Only 6 is a male and a professional.

47. Among the civil servants only one person is male. 4 and 5 are female civil servants
 \therefore The answer is (b).

48. Among the choices given, number '2' is the only person who is neither a civil servant nor a professional.

49. As he intends to pay the balance within ten days condition (vii) is fulfilled.

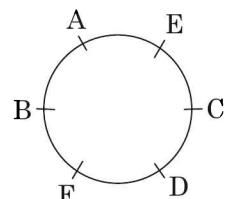
50. The candidate is supposed to deposit ₹ 16000 only as she being an SC candidate gets 20% deduction. So all conditions of eligibility are fulfilled.

51. The candidate has secured more than 90% marks. So, condition (iv) is fulfilled.

52. The candidate does not satisfy condition (iii), as he is supposed to pay ₹ 8000.

53. It is not mentioned whether the candidate is a son of a trustee or not.

54. An atom contains positively charged protons and an equal number of negatively charged electrons. So it is neutral. However, it is true that neutrons in the nucleus of an atom are neutral.



55. When hot water is poured in the glass tumbler in winter, its inner surface tends to expand while the outer surface in contact with cold atmosphere does not. This opposite interaction causes the tumbler to break.
56. Silver is a good conductor of electricity but it is not used to make electric wires because it is expensive.
57. Carbon forms a large number of compounds due to its tendency to form chains and rings of varying sizes, called its catenation property. However, the largest number of compounds are formed by Hydrogen.
58. When cut fruits and vegetables are kept in open, the vitamins in them get oxidised and remain of no use.

61. $6 + 3 \times 5 - 1 = ?$

Putting the actual sign in the above expression, we get,

$$6 \times 3 - 5 \div 1 = 18 - 5 = 13$$

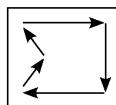
62. $\frac{12 \times 2 - 7 \div 5}{8 - 2 \times 5} = ?$

Putting the actual sign in the above expression, we get

$$\frac{12 - 2 + 7 \times 5}{8 + 2 - 5} = \frac{12 - 2 + 35}{5} = \frac{45}{5} = 9$$

63. The main figure rotates one step ACW in each turn and dot moves one step CW in each turn and also gets inside and outside the main figure alternately.
64. The figure is rotated 90° CW in each step. Then, two elements, one element, no element, again two elements and one element change their shape.

65. The symbols move in the order



in each step.

66. A similar figure appears every third step and the symbols inside the figure are replaced by new ones in each step.
67. The pin and the arrow moves to the adjacent side in ACW direction. Out of these two, the one which was inside, comes out and the other which was outside gets in.
68. The half arrow rotates 90° CW, moves to the adjacent side CW and gets inverted. The bent pin rotates 90° ACW and moves to the adjacent side CW.
69. The main figure is replaced by a figure with the number of sides less by one. The black circles inside the figure comes out on either sides of the figure and a white circle is introduced inside it.
70. The two figures approach each other and gets overlapped.
71. All except figure (e) are punctuation marks.
72. It is the only letter having four lines. The rest of all have three lines.
73. All other letters are fourth starting from the previous one. So figure (d) should be 'P'.

74. All except figure (a) are vowels.
 75. In all other cases, lines drawn inside the figure divide it into equal parts.
 76. Simplest triangles = 8

Triangles with two components = 5

Triangles with three components = 3

Triangles with four components = 1

Triangles with nine components = 1

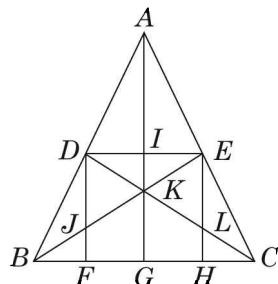
$$\therefore \text{Number of triangles} = 8 + 5 + 3 + 1 + 1 = 18$$

77. Horizontal lines are DE and BC i.e. 2 Nos.

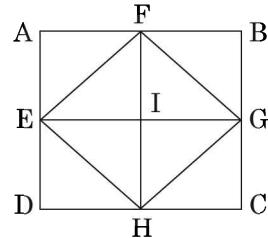
Vertical lines are DF, EH and AG. i.e. 3 Nos.

Starting lines are DC, BE, AB and AC. i.e. 4 Nos.

$$\therefore \text{Total number of straight lines} = 2 + 3 + 4 = 9 \text{ Nos.}$$



78. From the figure,
 DEFGC, AFGHD, BGHEA, CHEFB are 4 pentagons.
 AFGHE, BGHEF, CHEFG and DEFGH are 4 pentagons.
 DAFGC, DEFBC, AFGCD and ABGHD are 4 pentagons.
 In all, total number of pentagons = $4 + 4 + 4 = 12$.



79. $9 + 12 \times 3 + 9 = 54$, such cubes are painted on one face only.
 80. Number of cubes with at least one face painted
 $= \text{Total number of cubes} - \text{Number of cubes which are not painted}$
 $= 64 - 8 = 56$

Model Test Paper 3

7. An equilateral triangular plate is to be cut into n number of identical small equilateral triangular plates. Which one of the following can be possible value of n ?
 (a) 196 (b) 216 (c) 256 (d) 296
8. There are 10 identical coins and each one of them has 'H' engraved on its one face and 'T' engraved on its other face. These 10 coins are lying on a table and each one of them has 'H' face as the upper face.
 In one attempt, exactly four (neither more nor less) coins can be turned upside down. What is the minimum total number of attempts in which the 'T' faces of all the 10 coins can be brought to be the upper faces?
 (a) 4 (b) 7 (c) 8 (d) Not possible
9. 300 persons are participating in a meeting, out of which 120 are foreigners, and the rest are Indians. Out of the Indians, there are 110 men who are not judges, 160 are men or judges, and 35 are women judges. There are no foreign judges. How many Indian women attended the meeting?
 (a) 35 (b) 45 (c) 55 (d) 60
10. There are six persons : A, B, C, D, E and F.
 A has 3 items more than C.
 D has 4 items less than B.
 E has 6 items less than F.
 C has 2 items more than F.
 F has 3 items more than D.
 Which one of the following figures cannot be equal to the total number of items possessed by all the 6 persons?
 (a) 41 (b) 47 (c) 53 (d) 58

ANSWERS

1. (d) 2. (d) 3. (c) 4. (b) 5. (b) 6. (c) 7. (c) 8. (d) 9. (c) 10. (d)

Solutions and Hints

1. Including A and B, there are twelve stations in all. From each station tickets to 11 other stations are required.

$$\therefore \text{Total number of tickets required for a one way journey} = {}^{12}P_2 = \frac{12!}{(12-2)!} = \frac{12!}{10!} \\ = 12 \times 11 = 132$$

When four more stations are added, the total number of tickets required for a one-way journey from 16 stations in all is given by

$$\text{Number of tickets required} = {}^{16}P_2 = \frac{16!}{(16-2)!} = \frac{16!}{14!} = 16 \times 15 = 240$$

$$\therefore \text{Number of new types of tickets} = 240 - 132 = 108.$$

2. Speed of Aryan = 40 m/min; Speed of Rahul = 30 m/min
 Speed of Rahul's dog = 60 m/min

Distance travelled by Aryan in 5 minutes = $40 \times 5 = 200$ m.

Relative speed of Aryan with respect to Rahul = $40 - 50 = 10$ m/min
or relative speed of Rahul with respect to Aryan = 10 m/min

$$\therefore \text{Time taken to reach Rahul with Aryan} = \frac{200}{10} = 20 \text{ min}$$

\therefore Distance covered by dog in 20 minutes = $60 \times 20 = 1200$ m

► **Short cut:** Distance covered by the dog = Speed of the dog \times time taken

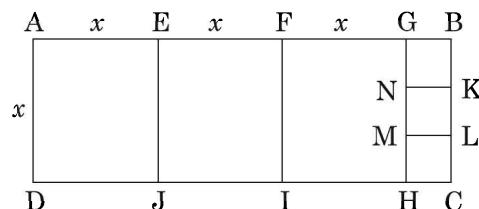
$$\begin{aligned} &= \text{Speed of the dog} \times \frac{\text{Relative distance of Aryan w.r.t. Rahul}}{\text{Relative speed of Rahul w.r.t. Aryan}} \\ &= 60 \times \frac{200}{10} = 1200 \text{ m} \end{aligned}$$

3. Here ABCD is divided into 3 squares by fencing EJ, GH and FI. The remaining rectangle GBCH is divided into 3 squares by fencing KN and LM.

Let AD be x .

$$\therefore AE = EF = FG = DJ = JI = IH = x$$

Similarly AD = EJ = FI = GH = BC = x



$$\therefore BK = KL = LC, BK = \frac{AD}{3} = \frac{x}{3}$$

$$\therefore GB = NK = ML = HC = \frac{x}{3} \quad (\because GBKN is a square)$$

$$\therefore \text{Total area of rectangle ABCD} = 3x^2 + 3 \times \left(\frac{x}{3}\right)^2 = 4320 \text{ m}^2$$

$$\text{i.e. } 3x^2 + 3 \times \frac{x^2}{9} = 4320 \text{ m}^2$$

$$\text{i.e. } 3x^2 + \frac{x^2}{3} = 4320 \text{ m}^2$$

$$\text{i.e. } \frac{10x^2}{3} = 4320 \text{ m}^2$$

$$\text{or } x^2 = 3 \times 432 = 1296 \text{ m}^2$$

$$\therefore x = 36 \text{ m}$$

$$\begin{aligned} \therefore \text{Size of plot} &= \left(3x + \frac{x}{3}\right) \times x \\ &= 120 \text{ m} \times 36 \text{ m} \end{aligned}$$

4. If the lady takes the seat reserved for ladies, it can be filled in 1C_1 ways = 1 way.

Remaining seats can be filled in by the remaining two men using 4 seats available in

$${}^4C_2 \text{ ways} = \frac{4!}{(4-2)!} = 4 \times 3 = 12 \text{ ways}$$

$\therefore \text{Total} = 1 \times 12 = 12 \text{ ways.}$

If the lady doesn't take the seat reserved for ladies, that seat can be filled in ${}^1C_0 = 1$ way.

The remaining seats can be filled by the three passengers in ${}^4P_3 = \frac{4!}{(4-3)!}$

$4 \times 3 \times 2 = 24 \text{ ways.}$

$\therefore \text{Total} = 1 \times 24 = 24 \text{ ways}$

$\therefore \text{Total number of ways} = 12 + 24 = 36 \text{ ways.}$

5. The square is divided into 9 smaller squares as shown in the figure.

The squares can be filled in ${}^6C_1, {}^3C_1, {}^2C_1, {}^1C_1, {}^5C_1, {}^0C_1, {}^0C_0, {}^0C_0$ and 4C_1 ways respectively as shown in the figure subject to the given condition.

$\therefore \text{Maximum number of ways in which a row can be filled is given by } {}^6C_1 \times {}^3C_1 \times {}^2C_1 = 6 \times 3 \times 2 = 36 \text{ ways.}$

So the answer is (b).

6. Taking the given condition, take A, B and C are together in the order, then number

of ways of arrangement = $\frac{6!}{3!} = 120 \text{ ways}$

7. An equilateral triangle can be cut into smaller equilateral triangles in 4 numbers.

So here the area of triangle = $\frac{\sqrt{3}}{4} a^2 = \frac{\sqrt{3}}{4} a_1^2 \times n$ where

a = side of larger equilateral triangle.

a_1 = side of smaller equilateral triangle.

$\therefore n$ will be a power of 4.

\therefore The answer is (c).

8. Not possible. Because you can't turn 'T' faces of all the coins in an attempt.

9. Given total participants = 300

Number of foreigners = 120

Number of Indian participants = $300 - 120 = 180$

Number of men or judges = 160

\therefore Women who are not judges = $180 - 160 = 20$

Number of women judges = 35

\therefore Total number of Indian women attended the meeting = $20 + 35 = 55$.

10. Put $d = 0; b = d + 4 = 0 + 4 = 4; f = d + 3 = 0 + 3 = 3; c = f + 2 = 3 + 2 = 5; e = f - 6 = 3 - 6 = -3; a = c + 3 = 5 + 3 = 8.$

$\therefore a = 8; b = 4; c = 5; d = 0; e = -3; f = 3$

$\therefore a + b + c + d + e + f = 8 + 4 + 5 + 0 - 3 + 3 = 17$

Adding multiples of 6 to 17, we get, $17 + 4 \times 6 = 41; 41 + 6 = 47; 47 + 6 = 53; 53 + 6 = 59 \neq 58$.

So the answer is (d).

| | | |
|-----------|-----------|-----------|
| 6C_1 | 3C_1 | 2C_1 |
| 1C_1 | 5C_1 | 0C_0 |
| 0C_0 | 0C_0 | 4C_1 |

Model Test Paper 4

Directions: Four alternatives are given for the following questions. You have to choose the most correct answer from the given alternatives.

1. A person travels 12 km due north, then 15 km due east, after that 15 km due west and then 18 km due south. How far is he from the starting point?
(a) 6 km (b) 12 km (c) 33 km (d) 60 km
2. Six persons A, B, C, D, E and F are standing in a row. C and D are standing close to each other alongside E. B is standing beside A only. A is fourth from F. Who are standing on the extremes?
(a) A and F (b) B and D (c) B and F (d) None of these
3. A person has 4 coins each of different denominations. What is the number of different sums of money the person can form (using one or more coins at a time)?
(a) 16 (b) 15 (c) 12 (d) 11
4. How many numbers lie between 300 and 500 in which 4 comes only one time?
(a) 99 (b) 100 (c) 110 (d) 120
5. How many letters of the English alphabet (capitals) appear same when looked at in a mirror?
(a) 9 (b) 10 (c) 11 (d) 12
6. How many three-digit numbers can be generated from 1, 2, 3, 4, 5, 6, 7, 8, 9 such that the digits are in the ascending order?
(a) 80 (b) 81 (c) 83 (d) 84
7. There are four persons A, B, C, D; and A has some coins. A gave half of the coins to B and 4 more besides. B gave half of the coins to C and 4 more besides. C gave half of the coins to D and 4 more besides. Both B and D end up with same number of coins. How many coins did A have originally?
(a) 96 (b) 84 (c) 72 (d) 64
8. While adding the first few continuous natural numbers, candidate missed one of the numbers and wrote the answer 177. Which was the number missed?
(a) 11 (b) 12 (c) 13 (d) 14
9. Four metal rods of lengths 78 cm, 104 cm, 117 cm and 169 cm are to be cut into parts of equal length. Each part must be as long as possible. What is the maximum number of pieces that can be cut?
(a) 27 (b) 36 (c) 43 (d) 480

Consider the following statements:

1. The total number of students that participated in the competition was 30.
 2. The number of games in which both players were girls was 78.

Which of the statements given above is/are correct?

14. There are three cans A, B and C. The capacities of A, B and C are 6 litres, 10 litres and 16 litres respectively. The can C contains 16 litres of milk. The milk has to be divided in them using these three cans only.

Consider the following statements:

1. It is possible to have 6 litres of milk each in can A and can B.
 2. It is possible to have 8 litres of milk each in can B and can C.

Which of the statements given above is/are correct?

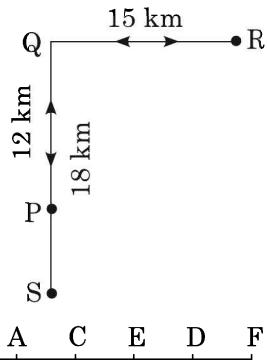
15. There is a family of 6 persons A, B, C, D, E and F. There are two married couples in the family. The family members are lawyer, teacher, salesman, engineer, accountant and doctor. D, the salesman is married to the lady teacher. The doctor is married to the lawyer. F, the accountant is the son of B and brother of E. C, the lawyer is the daughter-in-law of A. E is the unmarried engineer. A is the grandmother of F. How is E related to F?

ANSWERS

1. (a) 2. (c) 3. (b) 4. (d) 5. (b) 6. (d) 7. (c) 8. (c) 9. (b) 10. (b)
11. (c) 12. (d) 13. (d) 14. (a) 15. (d)

Solutions and Hints

1. The person starts from P goes through Q, R, return to S. So the distance of the person from the starting point = PS = QS – QP = 18 – 12 = **6 km**
So the answer is **(a)**.



2. The arrangement of six persons is given on the right side
 \therefore B and F are standing on the extremes
 So the answer is **(c)**
3. The number of denominations that can be formed using the given 4 coins
 (i) When only one coin was used, the required number = 4
 (ii) When two coins were used, the required number = ${}^4C_2 = \frac{4 \times 3}{1 \times 2} = 6$
 (iii) When three coins were used, the required number = ${}^4C_3 = {}^4C_1 = 4$
 (iv) When all the four coins were used, the required number = 1
 \therefore Total number of denominations = $4 + 6 + 4 + 1 = 15$
4. Numbers which are having 4 in unit place only = $20 \times 1 = 20$ (once in 10 numbers)
 Numbers which are having 4 in tenth place = $2 \times 10 = 20$
 Numbers which are having 4 in hundredth place = $100 \times 1 = 100$
 Number of 4s repeating in one's and tenth's place = 1 number
 Number of 4s repeating in one's and hundredth place = 9 numbers
 Number of 4s repeating in tenth and hundredth place = 9 numbers
 Number of 4s repeating in all three positions = 1 number
 \therefore Number of numbers with '4' in one place only = $(20 + 20 + 100) - (1 + 9 + 9 + 1) = 120$.
 So the answer is **(d)**.
6. (i) If 1 and 2 are provided in the first two places, then the third place can be filled in ${}^7C_1 = 7$ ways
 So the number of numbers so formed = 7
 (ii) If 1 and 3 are filled in first two position, then the third place can be filled in ${}^6C_1 = 6$ ways and so on. Total number of numbers so formed with '1' as 1st place = $7 + 6 + 5 + 4 + 3 + 2 + 1 = 28$.
 Similarly with 2 in the first place and 3 in the second place, third place can be filled in ${}^6C_1 = 6$ ways. So total number of numbers with '2' as 1st place = $6 + 5 + 4 + 3 + 2 + 1 = 21$ and so on.
 Similarly with 7 in the first place and 8 in the second place, third place can be filled in ${}^1C_1 = 1$ way. So the total number of numbers with '7' as 1st digit and '8' as 2nd digit is 1.
 So the total number of three digit numbers thus formed with all the given 9 digits = $28 + 21 + 15 + 10 + 6 + 3 + 1 = 84$.

7. Let the number of coins with A , B , C and D be a , b , c and d respectively.

No. of coins with A = ' a '

$$\text{No. of coins with } B = b = \frac{a}{2} + 4$$

$$\text{No. of coins with } C = c = \frac{b}{2} + 4 = \frac{1}{2}\left(\frac{a}{2} + 4\right) + 4 = \frac{a}{4} + 2 + 4 = \frac{a}{4} + 6$$

$$\text{No. of coins with } D = d = \frac{c}{2} + 4 = \frac{1}{2}\left(\frac{a}{4} + 6\right) + 4 = \frac{a}{8} + 3 + 4 = \frac{a}{8} + 7$$

Given $b = d$ at the end

$$\text{i.e. } \left(\frac{a}{2} + 4\right) - \left(\frac{a}{4} + 6\right) = \frac{a}{8} + 7$$

$$\text{or } \frac{a}{4} - 2 = \frac{a}{8} + 7$$

$$\frac{a}{8} = 2 + 7 = 9$$

$$\text{or } a = 72$$

Hence the answer is (c).

8. The sum of first 19 natural numbers comes to $\frac{19 \times 20}{2} = 190$

\therefore Addition of 13 makes it possible to get the correct sum.

Hence the answer is (c)

9. To find the maximum possible length, find HCF of given numbers.

HCF of 78, 104, 117 and 169

HCF of 78 and 104 is 26 (i.e. last divisor)

$$\begin{array}{r} 1 \\ 78 \overline{) 104} \\ 78 \\ \hline 26 \overline{) 78} (3 \\ 78 \\ \hline 0 \end{array}$$

HCF of 117 and last HCF (26) is 13.

$$\begin{array}{r} 4 \\ 26 \overline{) 117} \\ 104 \\ \hline 13 \overline{) 26} (2 \\ 26 \\ \hline 0 \end{array}$$

HCF of 169 and 13 is 13.

$$\begin{array}{r} 13 \\ 13 \overline{) 169} \\ 169 \\ \hline 0 \end{array}$$

Maximum number of pieces that can be cut, which are having 13 cm length is given by

$$\text{required number} = \frac{78}{13} + \frac{104}{13} + \frac{117}{13} + \frac{169}{13} = 6 + 8 + 9 + 13 = 36$$

So, the answer is (b).

10. Subjects are A, B and C

$$\text{Students passed in A} = 100 - 20 = 80\%$$

$$\text{Students passed in B} = 100 - 22 = 78\%$$

$$\text{Students passed in C} = 100 - 16 = 84\%$$

Minimum pass percentage = 78% and that can be maximum possible value of whole pass percentage. If students failed in A, B and C independently in the respectively given percentages, total failure percentage can be of maximum possible upto $20 + 22 + 16 = 58\%$ or pass percentage = 42%

\therefore Pass percentage lies between **42% and 78%**

Hence the answer is (b).

11. In every hour there will be two positions of hour hand and minute hand coming at right angles. Therefore in 9 hours there will be 18 such positions.

Hence the answer is (c).

12. If m is the number of balls in the first box, then in the second box, it will be $(m - 4)$, in the third box it will be $(m - 8)$ and so on.

$$\begin{aligned}\therefore \text{Sum of balls in } n \text{ boxes together} &= \frac{n}{2} [(m - 4) + (m - 4) + (n - 1) - 4] \\ &= \frac{n}{2} [2m - 8 - 4n + 4] \\ &= \frac{n}{2} [2m - 4n - 4] = n[m - 2n - 2] = 240\end{aligned}$$

\because Sum of balls obtained above is a multiple of n , value of n which is not possible from the given alternatives is 7.

\because n is a factor of 240, the value of n which is not possible from the given alternatives is 7. So the answer is (d).

13. It is given that number of boys (m) > Number of girls (n)

Given in 221 games plays, one player was boy and the other was girl

So, minimum number of boys = 221

So, minimum number of girls = 221

However, the number of boys is greater than that of girls.

So neither of the 2 given statements are correct. Hence the answer is (d).

14. We are having cans A, B and C with measurements 6 litres, 10 litres and 16 litres respectively. We can take 6 litres each in can A and can B. So statement 1 is correct. We are not having can for measuring 8 litres of milk. So second statement is false. Hence **1 only** is correct.

15. It is mentioned that F is the brother of E and E is the unmarried engineer. So it is not clear that whether E is male or female. Hence the relation of E to F **cannot be established**. Hence the answer is (d).

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